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PLANNED EFFICIENCY

in Foundry Layout

Photograph shows: A General View of a Section of a large Ironfoundry. One of the main Distributing Belt Conveyors can be seen, for feeding the Mixed Sand to the Moulders Supply Hoppers.

Photograph published by courtesy of The Hill Top Foundry Co. Limited, Wednesbury.

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Export of Scrap

The Government has decided to allow for a period of two months, starting last Friday, the free export of all sorts of iron and steel scrap,* except the alloyed variety commanding more than £25 per ton on the market. As HM Customs are either unwilling or unable to differentiate between iron and steel, no-one will know at the end of this period just what sort of material has been leaving this country. What is known from American experience is that during the last few years, the Gray Iron Founders Society has been vehemently protesting as to the adverse effect of exports on members' business. This can reasonably be interpreted as meaning a shortage among American founders of heavy cast-iron melting scrap.

The position here at the moment is that, whilst a surplus of some types of scrap exists, 10 per cent. of the iron foundries are short of heavy cast-iron machinery scrap, and we suspect that this is the very material which will fetch attractive prices on the export market. There is always an excess of some sort of scrap on the market of the type no-one wishes to handle, such as that carrying a vitreous-enamelled coating, or emanating from certain types of chemical plant. Good-class heavy machinery scrap is seldom in excess supply and though, because of the decline in castings production in recent months, there may be here and there in the merchants' yards an excessive stock, it must not be taken as representing anything other than a temporary phase.

Scrap is a major raw material of the ironfounding industry and on its availability and quality depends the production of engineering components and their price. The Government is well aware that to-day the leading exports from the country are the products of our great engineering enterprises, and its advisers must indeed have been ill-informed to allow of the placing of unspecified types of scrap on the international market. During the next two months, founders must make their voice heard in Government circles to ensure that this period of free exports of scrap is not extended to result in a permanent drain on one of their most valuable resources.

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* Details of the Order and further comments are quoted on page 722 of this issue of the JOURNAL.

Death of D. H. Wood

Mr. David Howard Wood, chairman of Constructural Engineering Company, Limited, died last Friday after a brief illness. The business he controlled was formed by his father; from a general boiler-making shop, he developed it to produce one of the leading makes of cupolas, and, before the 1914 war, pioneered the introduction of the Cupolette. After the death of his father, Mr. Wood greatly extended the activities of the business to include many types of foundry plant. In 1926, he was one of the founders of the Foundry Trades Equipment and Supplies Association, over which he presided a few years after its inception. Since that time he has always been a member of its Council.

In 1919, he joined the Institute of British Foundrymen and was immediately one of its most active members. He presided over the Birmingham branch and for many years represented it on the General Council. He presided over the Institute in 1946 and always found time to attend national (and most international) foundry conferences.

It is no exaggeration to say that few people were better known in foundry circles than Mr. Wood, or more universally liked. His unbounded energy and boyish pranks on the occasions of international conferences endeared him to the foundrymen of all nations. During the last few years, he suffered from ill health, but despite this he was still active and still gave time generously to the various committees upon which he served and was looking forward to the forthcoming Foundry Exhibition, in the organization of which he had contributed much.

He was a liveryman of the Worshipful Company of Founders and a Freeman of the City of London. His passing will be mourned by an exceedingly wide circle of friends, especially by those engaged in the manufacture of foundry equipment, for few gave so much towards the wellbeing of this industry.

Brightside's New Ingot-mould Foundry

A plea to consumers to help Sheffield industry by ordering now so that a reasonable level of production could be maintained, was made by the Master Cutler, Mr. J. Hugh Neill, speaking at a luncheon following the inspection of the new £600,000 ingot-mould foundry of the Brightside Foundry & Engineering Company, Limited. It might be sound practice for consumers to run down stocks when supply exceeded demand, he said, but this policy could be carried to extremes.

Mr. Neill believed it would not be long before demand at all levels began to surge, but, he said, there was a danger of a fresh bout of inflation. It was good for the steel industry no longer to have the whiphand in the market for it brought home to steelmakers the fact that the consumer was entitled to expect value for money and that value covered not only quality but service.

The new foundry has been designed to manufacture a full range of weights and types of moulds for ingots from 1 to 15 tons, and a quarter of its cost has gone into the provision of clean-air equipment. It has an annual output capacity of 24,000 tons of finished ingot moulds and is an extension of the existing foundry plant.

Mr. Ambrose Firth, chairman of Brightside Engineering Holdings, Limited, welcomed visitors on Tuesday last week and host for the "open week" was Mr. Thomas C. Firth, deputy chairman and joint managing director of Brightside Engineering Holdings, and chairman of Brightside Foundry & Engineering.

Forthcoming Events

DECEMBER 16

Association of Bronze & Brass Founders

London area: Christmas luncheon 12.30 for 1 p.m. followed by members' meeting at 2.30 p.m., at the Clarendon Restaurant, Hammersmith, London, W.6.

Institute of British Foundrymen

East Anglian section: Three talks on sand casting, die-casting and metallurgy of aluminium alloys—illustrated with film, 7.30 p.m. in the Lecture Hall, Public Library, Ipswich.

DECEMBER 17

Institute of British Foundrymen

Birmingham branch: "Automatic Buehrer Moulding and Pouring Plant in the Malleable Iron Foundry of George Fischer, Limited, Schaffhausen, Switzerland," by C. Zehnder, 7.15 p.m., at the Byng Kenrick Suite, College of Technology, Gosta Green.

Incorporated Plant Engineers

Kent branch: "Treatment of Trade Effluents and Methods of Purification," by T. Waldmeyer, 7 p.m., at the Kings Head Hotel, High Street, Rochester.

Institution of Production Engineers

Edinburgh section: "Gear Production," by W. H. Harrison, 7.30 p.m., at the North British Hotel, Princes Street, Edinburgh.

DECEMBER 18

Incorporated Plant Engineers

Merseyside and North Wales branch: Film evening: "Corrosion in Action" and "Le Mans Race," 7.15 p.m., at The Blossoms, Chester.

DECEMBER 19

Institute of British Foundrymen

Northampton and district section: Annual dinner 7 p.m. at the Plough Hotel, Northampton.

Bristol and West of England branch: "Production of Aircraft Castings," by C. W. Hicks 7.30 p.m., at the Royal Hotel, Bristol.

Forty Years Ago

Apparently, in December, 1918, the word productivity was not in common use, as in the JOURNAL issue of that date reference was made to a "Report of the Committee on Commercial Efficiency" issued by the Federation of British Industries which has a section on production, "carrying recommendations on interchange of statistics, standardization of methods and the working out of details of cost." In the same JOURNAL was a report of a presidential address on "The Apprentice Question," where the author was saying exactly the same thing as is being said to-day—and which has been repeated periodically throughout the intervening period. The training curriculum quoted was rather more advanced than those advocated to-day. Liberal studies were stipulated for inclusion in the fourth year, such subjects as Constitution of State and Empire; Imperial Revenues and Expenditures; the Rights and Duties of Citizens, being set forth.

"Automatic Moulding and Pouring Plant"

A few places have been made available to London-area members of the Institute of British Foundrymen at the meeting next week, organized by the British Cast Iron Research Association, when a paper and film on the above subject will be presented by Mr. C. Zehnder (of George Fischer's, Schaffhausen), in London. The meeting is to be held on Tuesday, December 16, at 2.30 p.m. in the Assembly Hall (Craven Street entrance, near Charing Cross station) of the Royal Commonwealth Society. Those members wishing to accept this invitation should inform the London branch secretary, Mr. A. R. Parkes, c/o FOUNDRY TRADE JOURNAL, 17 and 19, John Adam Street, London, W.C.2, 'phone: TRAfalgar 6171.

Control of Production in the Enamel Shop*

By A. K. Williams

This paper is a comprehensive survey of the difficulties encountered when enamelling cast iron. Mr. Williams explains the way to overcome various problems, such as warping, and "firecracking," and gives a detailed explanation of the procedure he recommends for producing enamelled castings of regular, good quality.

If modern domestic and other articles are to be satisfactorily and economically enamelled, it is essential that control of the enamelling operations starts at the first stages of production, and that great care and much thought be given to the design of the various components. This has become more and more imperative owing to the increasing demand for enamel finishes (in white, cream and pastel shades) having high resistance to thermal shock, impact, abrasion, heat and acid attack, and a high degree of colour stability. It is a mistake to consider that enamelling operations can be successfully controlled solely by what happens after the castings or sheet-metal parts have been received in the enamel shop for processing.

Design Requirements

Unless the requirements of the enamelling processes are fully appreciated by those responsible for design, and the limitations and possibilities of those processes acknowledged, it is not to be expected that the various components will allow of practical and economical methods of production in the foundry or press shop, or in the enamel or assembly shops. The first step will have been taken towards the multiplication of processing troubles, which will not only affect the quality and quantity of the final products, but also adversely affect the cost of production of articles designed to satisfy the high standards demanded by an increasingly competitive, well informed and critical market. However, it is clear that, given co-operation, much can be done by the designer to ensure that the various components conform to well-known and accepted principles, which have been found to be helpful in both the foundry and the enamel shop. Requirements in these departments generally coincide, inasmuch as both are concerned with the cooling down and crystallization of liquids or semi-liquids to the solid state, and the physical problems involved.

Processing

On the other hand, those responsible for the processing operations in the various departments must respect the aspirations of the designer. If progress is to be made they too must appreciate that, since their processing limitations must at times have an unfortunate restraining influence on design in one way or another, it becomes all the more important that all the possibilities of design and production should be jointly, carefully and thoroughly explored, in order that the desires of the designer may be met, as far as is practicable. Their joint endeavour will enable these processes to be practically applied, to give the best final product, capable of being made at an economical price, to the standard of quality required.

Customers' Co-operation

Unfortunately, a large and important section of the enamelling industry is not in a position to control these early stages of production. If this section could only persuade their customers to co-operate when they are designing their new products, many of the enamelling difficulties so frequently met, which are due to faulty design from the enamelling angle, would be eliminated. The author feels sure this desirable co-operation could be attained, seeing that it is of equally vital importance to both the jobbing enameller and his customers. Unquestionably, the financial advantages to be gained by such co-operation would far outweigh any risks incurred.

Generally speaking, the same care and thought given to the development of foundry patterns must be applied to the development and design of press tools, in order that processing scrap can be kept down to a minimum. It is false economy to use too light a gauge of metal if excessive warping, chipping and field losses are to be avoided. One well-known cooker manufacturer cut enamel scrap losses from 5-7 per cent. to 2-3 per cent. simply by the introduction of 18 gauge instead of 20 gauge metal, principally by the reduction of chipping due to increased rigidity of their components.

Problems Encountered with New Designs

When castings of new design are being developed for production, considerable adjustment of patterns and modification of design may be necessary if castings to a standard of regular quality are to be produced; this will call for full co-operation between the foundry, enamel shop and designer.

Recommended Procedure

Having gone over the drawings for the new products with the designer with a view to discussing any features likely to give trouble in the foundry, and being satisfied that as far as possible the foundry requirements have been taken care of,

* Presented to the Scottish section of the Institute of Vitreous Enamellers. The author is on the staff of Cannon Industries, Limited, of Bilston, Staffs.

Control of Production in the Enamel Shop

the foundry manager will then proceed to have tin patterns built up. Should any possible causes of scrap be noted by the patternmaker, they must receive careful consideration, and any agreed modifications must be incorporated in the patterns.

From each tin pattern a test casting is made to determine the movement of the castings during cooling. Any movement should be duly recorded, and any cambers considered necessary provided for in the patterns. More test castings are then made and cambers readjusted until " true " castings are produced. Further castings are then made for testing under normal processing conditions. These are heated up in a static annealing or fusing furnace and then brought out, a careful visual check being made of the relative cooling rates of various parts of the castings. These observations are recorded and carefully analysed. If need be, further modifications are incorporated in the patterns to correct any lack of balance until castings are produced which can be reasonably expected to behave satisfactorily in mass production.

Larger batches of castings are then made and the results of the annealing, shotblasting and fusing operations carefully watched at each stage. Should " firecracking," tendency to " stick " or excessive warping (which cannot be corrected by varying the processing procedure) recur during these processes in the same position on the castings, then once again modifications to patterns must be made to meet these production requirements. This may be done either by strengthening or weakening the castings locally, or by altering the camber, so that the resulting castings will be pliable enough to be straightened by ordinary production methods, after having been distorted either by heat or shotblasting. Tendencies to both firecracking and distortion are more readily controlled and corrected with pliable castings.

Mass Production

After satisfactory conclusions have been reached on these points, mass production patterns are made and, the desired results having been produced, the production drawings are then completed to record correctly the castings as accepted for mass production. Any modification subsequently agreed to must be incorporated on these drawings—*e.g.*, if castings are to be fused in static furnaces, they will sometimes require to be modified to enable them to be adequately supported in the furnace, without actually altering their design by the provision of resting strips. This is the case only if it is found to be impracticable to provide specially designed perrets. Again, if they are to be fired in continuous furnaces, it may be necessary to incorporate lugs with holes in to enable two castings to be hung one below the other in order to increase throughput.

Foundry Practice

Having reached this stage, it is now up to the foundry manager to control his foundry practice so that the castings produced can be enamelled satisfactorily. It is essential that a regular check be carried out to ensure that those procedures which have given good results are strictly adhered to in the foundry. The enamel shop should be advised of any change in foundry procedure likely to affect the enamelling, if much time and money are not to be wasted by the enamel shop in trying to track down defects which will subsequently prove to be the direct result of changes in melting or pouring temperatures; changes of facing or moulding sand; alteration of gates and runners, or of the composition of the metal itself. It is surprising how quickly the repercussions are felt in the enamel shop. It is no satisfaction to be told, after making thorough processing checks in the enamel shop, that changes made in the foundry have been responsible for the enamelling troubles.

In order to help trace defects quickly, all castings should be dated and marked with the pattern and moulder's number. Castings should be subjected to a light shotblasting in the foundry to show up those with obvious defects, in order to prevent them going forward to the processing departments, and incurring unnecessary expense. Efforts to produce castings at a given price can be the cause of much scrap, and should be deprecated. It is always far cheaper to enamel good castings, and it is the final cost of the enamelled castings which matters.

Preparation of Castings

Prior to being delivered to the enamel shop after fettling and dressing, those castings which go to make up the focal points of quality of any appliance should be " prepared for enamelling " by having all sharp edges filed, corners rounded off and rough surfaces smoothed, in order that enamels giving high resistance to heat and acid attack, thermal shock and abrasion can be applied thinly and satisfactorily to the finish called for.

After dressing and preparation, those castings which require machining to facilitate assembly are sent to the machine shop. It is advisable that as much drilling, tapping and machining as possible should be done before enamelling to avoid damage by scratching or chipping of the enamel in the machine shop, or in transit. However, it is not possible to cut out all subsequent machining, particularly where fitting surfaces are liable to become distorted during annealing, shotblasting or fusing. No matter how good are the castings which have been produced for enamelling, there are still many pitfalls to be avoided in the enamel shop which call for strict control at all stages if the enamelling processes are to be carried out successfully.

Enamelling

Annealing

Usually, after the castings have been received for enamelling, the first operation is annealing; this can be carried out in static or continuous furnaces which should be thermostatically controlled. Where a continuous furnace is available, it is prefer-

able to use this for annealing since, when castings are suddenly plunged into, and as suddenly withdrawn from, a static furnace at a temperature of 830 deg. C., they are subjected to a severe thermal shock which is likely to cause firecracks or warping. In a continuous furnace, however, the castings are taken up to the annealing temperature gradually, and as gradually cooled down again, giving the castings a much kinder treatment and one not so liable to cause warping or firecracking.

Whichever type of furnace is used, the castings should be taken up to a temperature of 20-30 deg. C. above that at which the enamel with which they are to be coated will be fused, to enable the gases that might otherwise be released during fusing with resultant boiling, to escape during annealing. It is not advisable to exceed 830 deg. C., since above this temperature the black magnetic oxide of iron (Fe_3O_4) is rapidly formed, and it is extremely difficult to remove. Below 830 deg. C. the lower oxide of iron (Fe_2O_3) predominates, which is far more readily removed by shotblasting. Furthermore, the excessive shotblasting required to remove Fe_3O_4 will not only add to the cost but is also liable to cause warping or fracturing. Generally, a soaking period of 15 minutes at the annealing temperature is sufficient to ensure the release of gases and stresses in the castings and reduce the liability of the enamel to " boil " over their heavier parts.

Sometimes it is practicable to dispense with annealing for certain castings provided there is no time lag between the foundry and the enamel shop. For a period of time some plants can produce castings of first grade quality which do not necessarily require annealing and will take a good acid-resisting finish without difficulty. Then, suddenly, for no apparent reason whatsoever, everything will be enamelled with difficulty and much scrap will be made, in spite of all the skill the enameller can employ. It is cheaper to anneal than to process without annealing and then have to blow off and reprocess; furthermore, if annealing is dispensed with, difficulties are liable to arise from increased fracturing during shotblasting or warping during fusing, due to the cooling stresses having been left in the castings.

When castings have been machined and become oily, they must be annealed to remove the oil. It is, however, quite a common practice to use an annealing grip coat for some finishes and so cut out one firing but, where high quality finishes in light colours or pastel shades are required, this is not always a practical proposition.

The loading of castings for annealing calls for very careful consideration: they must be supported or hung in such a way as to avoid distortion or unequal heating up. All work done must be carefully logged giving details of numbers, time, temperature, etc., and checked against the recording pyrometer chart.

Shotblasting

Whether castings are annealed or not, they are subjected to the process of shotblasting to remove surface impurities before being sprayed with enamel. Here again various methods may have to be tried out to correct tendencies to warp, " stick " or fracture. Shotblasting is very expensive, so the type of machine to suit the job must be carefully chosen and consideration given to the relative cost of operating with compressed-air machines or wheelabrators, and the pros and cons of their use. However, should it be found necessary to employ a combination of these machines, it is advisable first to blast by hand those parts of the castings which require special treatment, because the operator can see far better where he has blasted on castings in the annealed state than on those which have already been wheelabrated.

The size of shot used must be determined by experience; the larger the shot the more likely are the castings to be fractured or warped and the greater the wear and tear on the machine. On the other hand, the larger the shot the longer its useful life. Consequently, a compromise has to be arrived at which gives the best coefficient between work done, wear and tear and consumption of shot.

Control must be exercised to ensure that the percentage of fines is kept within specified limits. If the castings are allowed to become coated with a film of graphitic and magnetic dust, this dust will be liable to cause the very enamelling troubles which the shotblasting process is designed to eliminate. The percentage of dust in the shot can be controlled by sampling the shot in use regularly and correcting the balance of the shot grains. The testing machine consists of a series of B.S. sieves of different mesh with a pan at the bottom to receive the dust, agitated and revolved by a small motor. The percentage weight of the shot which stays on the 20-mesh sieve and the amount which goes through the 60-mesh sieve gives a guide to the balance of sizes in the bulk shot in the machine. The maximum fines allowable for wheelabrators is 20 per cent. and for cabinets 7 per cent. Zirconium silicate can be safely added to the shot used in compressed-air machines to help reduce the dust deposit but it is unsuitable for use in wheelabrators owing to its small grain size and low specific gravity.

Many claim that one of the functions of shotblasting is to give a " key " for the enamel. A comprehensive research carried out recently in the USA showed this claim to be overrated. Fine round steel shot has been used for many months with quite satisfactory results, after comparative tests had been made for adhesion, thermal shock and finish. The use of this type of shot reduces very considerably the maintenance costs and shot consumption; it also reduces to a minimum the dust hazard. There are, however, certain limitations to its use. Logs must be kept of all castings shotblasted, giving details of time, shot used and numbers of new and blown-off castings processed, etc.

Spraying

After the castings have been shotblasted they must be examined carefully for warping, fractures, rough surfaces, casting defects and cleanliness, etc., before being passed forward to the sprayers. This can be done at the filling-in bench where a control check of numbers and types of casting passed for spraying or rejected is made and recorded.

Control of Production in the Enamel Shop

In order to avoid discoloration of the enamel by the filler, particularly for dark or black cover coats, the filler can be coloured with some of the enamel with which the castings are to be sprayed. Control of the spraying operation must be very close both as regards application, and drying and handling. Each operator should have his or her own gun, which must be kept in good working order. Various spraying jigs must be provided to avoid overspill adhering to the castings and to avoid damage to the biscuit whilst they are passing through the dryer or being transferred to the furnace. Castings to take a mottle or black finish are usually enamelled direct on to the iron in one coat. Owing to the liability of black enamels to bloom, castings should be sprayed, if possible, in a separate section with its own dryers which do not allow any products of combustion to enter the drying chambers. If the local water contains sulphates it should be distilled for milling black enamels. All black enamels should be fired as soon as possible after spraying and drying to avoid picking up sulphur from the shop atmosphere. To meet heat-resisting and thermal shock requirements, the enamel should be 8 to 12 thou. with 10 thou. as the target.

Having ascertained by experience the best type of gun, size of nozzle, spraying pressure and enamel consistency for each operation, these must be rigidly adhered to and subject to control. It is difficult to obtain in one coat a smooth enough finish of high gloss and consistent colour on all the various parts which go to make up an assembled appliance, with enamels having the high degree of resistance to acid attack, etc., called for by modern market requirements. Particularly is this so when a percentage of the castings have to be recoated for one reason or another. Experience of these requirements will determine whether an annealing grip or glaze undercoat is used; whichever method is adopted there must be as little time as possible lost between the subsequent operations of respraying and fusing. No casting should be recoated more than once if it is to withstand thermal shock or impact requirements, and avoid hairlining or chipping. The maximum coverage for white or coloured enamels on an undercoat should be 17/18 thou.

Inspection and Storage

All castings rejected for casting defects, as distinct from enamelling defects, should be drilled at the back before blowing off and re-enamelling; any casting failing to pass the second time should be unhesitatingly scrapped. All castings thrown out for respraying must be recorded and covering chits made out to enable checks to be made on the sprayers' counts.

Whilst all controls in the enamel shop are necessary and important if consistently good results are to be obtained, the milling operations and care of enamels after milling call for the greatest measure of control. Great care must be taken at every stage of the preparation, storage and issue of enamel to the shop. Very careful records must be kept of weight, milling times, fineness, etc., of each milling and the percentage of reclaimed enamel added.

After milling the enamel should be stored in a separate room, the temperature of which can be controlled, especially during the winter months, and each bin of enamel tallied to record its milling history in order to facilitate reference back in the event of trouble. From each milling a production piece should be sprayed and fired under shop conditions and tested for colour under a colour matching lamp. In addition to the fineness and specific-gravity tests made before the mills are unloaded, the specific gravity should be tested again before issue and additional checks made from the enamel in use to discourage any tampering after issue.

For cast-iron cover coats the consistency should be 39½ to 39¾ oz. and for black 37 oz.; glaze 39¼ oz., and grip 29½ oz. For sheet-iron cover coats 34½ to 35 oz., and for sheet-iron ground coats about 34 oz., or 3½ oz. on a 2-ft. sq. plate dry weight. Checks should be made frequently according to the volume of work swilled. Mottle 38¼-38½.

Cast-iron returns should be mixed in a Mitchell or other mechanical mixer, re-sieved over a magnet and added to the milled enamel about ½ hr. before unloading. Up to 33½ per cent. can be added if care is taken to avoid contamination at the spray bottle. Sheet-iron returns should be sieved over a magnet, milled in a small mill with an addition of ½ per cent. clay and added to the miller enamel about ½ hr. before unloading. Up to 25 per cent. can be added if the returns are clean.

Supervision

In order to control the losses which occur during the enamelling processes, there must be intelligent supervision on the shop floor all the time by foreman and chargehands, and comprehensive records must be kept of all articles thrown out for enamelling or other defects, giving the cause of rejection and the stage at which rejection took place. These records must be analysed and incorporated in a weekly report, from which percentages of articles reprayed; blown off; enamelled, and total scrap, can be ascertained. The information thus obtained must be discussed regularly by the shop manager and his foreman.

The foundry must also be advised of all castings rejected in the enamel shop, stating the stage at which rejection took place:—(1) as received; (2) after annealing (3) after shotblasting, and (4) after enamelling, and sub-divided to indicate whether they were rejected for breakages or firecracks, or for bad castings, in order to help the foundry manager with his controls. Regular checks must be made of the working temperatures of the dryers and furnaces, and fuel consumption. In the case of sheet iron, incoming pressings must receive a percentage check of metal surface, excess oil, etc.

There should be careful control of the pickling-vat temperatures and strengths, particularly so if nickel dip is used, when the controls must be both

Enamel-shop Production Control

close and frequent. Nickel-dip control should be carried out by a chemist. Except on continuous-pickling plants, the vats should have the temperature and time of immersion painted boldly on each. Impact and bend tests should be made daily on fired ground coat. All furnace recording instruments and pyrometers should be checked at least twice a week and serviced by the makers regularly. All acid-resisting enamels used should be checked weekly for thermal shock, abrasion and adhesion as well as acid resistance. Last but not least, the shop must be kept clean. It can be said that the whole of these operations are carried out on "The Seven C's."

"Careful Control,"
"Constant Cleanliness,"
"Close Co-operation,"
governed by "Commonsense."

Without commonsense, excesses may arise which could readily defeat the object of all controls—efficiency.

Conclusion

There are few problems which the experienced enameller has to face, the answer to which cannot be found by the exercise of commonsense supported by co-operation, control and cleanliness. For no answer will be found which is not based on commonsense, and one may rest assured that if an apparent solution to any problem does not make commonsense, then that is not the correct answer.

The author thanks the directors of Cannon Industries Limited for allowing him to give the paper, and his colleague Mr. B. B. Bagley, foundry manager, for his valuable help.

Asquith Machine Tool Corporation's bid for Kitchen & Wade

Basis of an offer by the Asquith Machine Tool Corporation, Limited, for the whole of the ordinary capital of Kitchen & Wade, Limited, manufacturers of drilling, boring, and honing machines, of Halifax (Yorks), is one new ordinary 5s. share of Asquith Machine Tool for every two ordinary 4s. shares of Kitchen & Wade, together with a cash payment of 2s. for each ordinary share. Conditions of the offer are:—Acceptance by not less than 90 per cent. of the shareholders, or such smaller percentage as Asquith Machine Tool may agree to accept; Treasury consent to issue the new shares involved, and the sanction of the shareholders of Asquith Machine Tool.

The directors of Kitchen & Wade have announced that they have considered and rejected an offer to acquire the issued capital. Members are advised to retain their shares. The issued capital consists of £495,000 in ordinary shares.

The company's chairman, Mr. A. Kitchen, considers that it should be possible to maintain a yearly dividend of at least 10d. per 4s. share, or 20⅝ per cent., on the capital as increased to £495,000 by a one-for-two scrip issue last July. Two interims, the first payable on December 30, have been declared, making 6d. per share.

SUPERHEATER COMPANY, LIMITED—Mr. W. B. Sallitt, general manager of the company's nuclear division, has been appointed a special director.

"Battle" for British Aluminium Co.

Rumours which had been circulating for some time regarding future plans of the British Aluminium Company, Limited, have been confirmed (or dispelled) with the emergence of details of two important offers which have been made. The lead was given by British Aluminium on November 29 when, "in view of the rumours and publicity" which had arisen, the company made an interim statement.

It was learned that the company, which manufactures nearly a third of all the aluminium products made in the UK, had recently entered into an agreement with the Aluminium Company of America (Alcoa) whereby, subject to the necessary Treasury consents, Alcoa undertook to subscribe for the entire unissued ordinary capital—4,500,000 shares—on terms which would ensure British Aluminium the finance it would require over the next few years and which would leave undisturbed the present body of stockholders, retain the British nature of the company, and secure the financial strength needed for British Aluminium to exploit fully its potential development.

The board favoured the agreement, but pointed out that the position had been complicated by an offer, also subject to consents, from other parties to acquire the presently issued ordinary stock of the company. Because of the agreement, the conditions attached to the offer could not be fulfilled and the offer could not be transmitted to stockholders.

Tube Investments' Letter

The offer—by Tube Investments, Limited, was for a share and cash offer equivalent to 78s. for each British Aluminium £1 share at current market prices, and represents about £35,000,000. Sir Ivan Stedeford, chairman of TI, told a Press conference that the offer would ensure that the control of British Aluminium could not pass out of British hands. He added that it might be reconsidered if the deal with Alcoa went through.

Further developments came on December 1, when Tube Investments released the text of its letter of intent, dated November 5, and Alcoa issued a statement on the reasons for its deal.

The TI letter stated that the company was prepared to make an offer to British Aluminium's ordinary shareholders "to acquire their shares either for cash or for cash and shares on a price basis which would be attractive to them and not least in terms of market price."

A later development was the decision of the Tube Investments board to put its offer direct to the British Aluminium shareholders, and to submit one more request to the B.A. board to disclose the full terms of the Alcoa contract. The offer will go out as soon as possible, and, when it does, the main responsibility for deciding between the two sides will rest where it ought to have been all along—with the stockholders. The Government has apparently decided, understandably, that it does not want to become involved on Treasury consents until the dispute has been sorted out by the parties concerned.

F. H. LLOYD & COMPANY, LIMITED, steelfounders, etc., of Wednesbury (Staffs)—In maintaining the interim dividend at 2½ per cent., the directors state that this must not be taken as an indication that the final dividend, which was 10 per cent. for the year ended March 31, 1958, will be unchanged, as present indications are that profits for this year will be substantially lower.

American Letter

Electric Furnace Conference

The AIME Electric Furnace Conference was held recently at Detroit, Michigan (December 3 to 5). Brief synopses are given of the three sessions which were of particular interest to foundrymen.

Foundry Practice—Casting

The following points were considered:—Effect of various additions to the electric-arc and induction furnace on gas contents; pinhole porosity in high-alloy steel castings made in green-sand moulds; high-frequency induction-melting of steel in a furnace unit up to 5½ tons capacity, and oxidation and deoxidation practice in the high-frequency induction furnace.

Melting-cost Reductions

The use of direct reduced iron in the electric furnace; simplified calculation of effects of oxygen-blowing rates, and the linear programming of the material costs of stainless-steel, were discussed.

Special Casting Technology

The following techniques were reviewed:—Effect of phosphorus and sulphur content on the ductility and toughness of cast low-alloy steels; desulphurization of steel by the injection of lime and aluminium-magnesium alloy; improving electric furnace refractory-life by special shell-cooling and split-heat techniques.

ADCI Annual Meeting

The American Die Casting Institute, at its annual meeting, indicated that die-casting business was definitely improving. It was reported, however, that the first half of 1958 registered an overall decrease of about 40 per cent. in jobbing diecasting production compared with the same period in 1957. The low point occurred in March and April, but some recovery was expected during the second half of the year. The Institute estimate that total aluminium and zinc die-casting output, captive and jobbing, will amount to 438,500 tons in 1958, 20 per cent. below 1957 production. Most of the decline had resulted from lagging sales of automobiles and home appliances, which were two major markets for die-castings. Production in 1959 would depend on demand for consumer goods. The following survey was made at the meeting:—

Aluminium Die-castings

One half of the total aluminium castings output goes into pressure-die-castings, and 30 per cent. into gravity-die-castings.

TABLE 1.—*Aluminium Die-casting Production (tons).*

1956.	1957.	Jan.-June, 1957.	Jan.-June, 1958.
167,700	165,000	95,444	63,332

Zinc Die-castings

The use of zinc in pressure-die-castings has increased with the prevalent trend towards die-casting. Production has tripled since 1947 from a 125,000-ton rate to approximately 400,000 tons in 1957.

TABLE 2.—*Zinc Die-casting Production (tons).*

1956.	1957.	Jan.-June, 1957.	Jan.-June, 1958.
309,524	285,044	153,424	108,378

Sixty per cent. of all zinc die-castings go to the automobile industry, and 15 per cent. to home appliances. The use of zinc die-castings in the automotive industry has risen uniformly in recent years from about 43 lb. per car in 1950, to about 64½ lb. in 1957 and 1958. The biggest automotive user of zinc die-castings this year, as last, is Buick, with a total of 164.3 lb. per car, an increase of almost 24 lb. on the 1957 figure. This figure represents 53 body parts supplied by Fisher Body, plus an additional 96 functional and decorative parts—a total of 149 zinc die-castings used. The heaviest die-cast zinc part is the body radiator grille (23.3 lb.), and the smallest a rear view mirror component (0.005 lb.).

In typical Chevrolet models, the average number of zinc die-castings is 35 to 37, with a total weight of 35 to 40 lb., for parts ranging from a 0.023-lb. speedometer flexible-shaft assembly component, to a 5-lb. instrument cluster assembly. Ford Motor Company use from 86 to 99 lb. of zinc die-castings on each of their different Edsel models.

Decorative parts are generally die-cast in Society of Automotive Engineers zinc alloy 903* and are chromium plated, and painted. Functional parts are frequently cast from zinc alloy SAE 925† which is identical to SAE 903, but has copper added. Most automobile manufacturers use this alloy for carburettors and fuel pumps where its better impact strength, porosity, and good holding strength in tapped holes are needed. Decorative and functional parts are designed to minimize machining operations, substitute single pieces for an intricate assembly, and improve appearance.

AIME Metallurgical Society Meeting

At the AIME Metallurgical Society's autumn meeting held in October, an effort to determine the effects of melting and casting a jet-engine alloy in air, in vacuum, and under argon, was described in a paper entitled "A Decision Technique for Evaluating the Effect of Melting and Casting Environments on Stress-Rupture Properties," by J. T. Brown, Westinghouse Electric Corporation. A synopsis of this paper follows:—

Stress-rupture tests were performed on a new nickel-base high-temperature casting alloy intended for use as a turbine-blade material at 982 deg. C. Seven heats of the alloy, each heat yielding nine stress-rupture specimens, were prepared by varying their processing procedure as follows: vacuum-melted and cast; vacuum-melted and cast under argon; vacuum-melted and cast in air; vacuum-melted stock remelted and cast under argon; vacuum-melted stock remelted and cast in air; melted and cast under argon, and melted and cast in air.

Stress-rupture tests at 982 deg. C./11 tons per sq. in. and 927 deg. C./13½ tons per sq. in. were made in triplicate on each heat. The decision technique for evaluating the processing conditions involved ranking the heats with respect to each other for average rupture time, average elongation, and spread in rupture time between tests. A value was determined for each property, and the relative ranking of each heat was established. This technique revealed that either vacuum or argon melting and casting resulted in good properties. When melted or cast in air, the alloy displayed poorer and less predictable properties.

The alloy under investigation was made to approximately the following composition:—Cobalt, 10 per cent.; chromium, 12; tungsten, 7 to 8; carbon, 0.10; zirconium, 0.05; titanium, 4.0; aluminium, 4.0; boron, 0.05 per cent., and the balance, of nickel.

Room-temperature tensile tests were made in duplicate, and the results are included, along with macrophotographs of the fractures of the stress-rupture specimens, and photomicrographs at 500× magnification of the structure. These results are qualitatively correlated with the properties. Absolute values of the stress-rupture properties also show the new alloy to be significantly stronger and able to be used at higher temperatures than any commercial alloy.

* SAE 903—3.5–4.3 Al, 0.15 Cu.
† SAE 925—3.5–4.3 Al, 0.75–1.25 Cu.

"A Complete Change of Programme!"

Holroyd & Hall, Limited, adapt a Bradford Cinema for Patternmaking

Conversion of existing buildings for foundry or kindred purposes is so seldom a complete success that the exception to this dictum makes interesting reading. This account* and illustrations show how Holroyd & Hall, Limited, have changed a disused cinema into a modern, well-lighted and well-equipped wood and metal patternshop. That the metamorphosis has been successful is amply shown by the quality of the patternwork at present being despatched from the works, and the directors and, in fact, the whole staff, are enthusiastic about this, their "second house."

Holroyd & Hall, Limited, patternmakers in wood and metal, Bradford, had outgrown their existing premises. The severe shortage of suitable workshop buildings and—that bane of small firms—inadequate financial resources necessary to build a new patternshop, led them to consider conversion of a disused cinema for their purposes. They well realized that cinema premises are extremely limited in their industrial application, and it was in this frame of mind that officials of the firm went along to see the building for the first time.

They wanted 4,000 to 5,000 sq. ft. of shop-floor area, room for a canteen, a small car-park, and above all, room to lay down a modern plant suitable for producing pattern equipment on an economical and efficient basis. The cinema building inspected at Legrams Lane (the old "Empress," a long-established landmark in Bradford) seemed, on first inspection, to have latent possibilities for the purpose envisaged. Expert advice from a firm of surveyors assured the principals of the firm that the building was a sound structure, and the decision to purchase was made.

Method of Conversion

A builder, a team of electricians and some back-breaking work from the firm's staff, made a big job seem to be not so big. In addition, the Local Authorities put no obstacles in the way and were, in fact, extremely helpful in all matters.

Patternshop

The cinema to be converted (see Fig. 1) had no balcony and hence the building was not unduly lofty. The auditorium, some 80 by 50-ft. wide, was stripped of seats, and the wooden floor was lifted and levelled. A portion down the centre of the auditorium, 80-ft. long by 14-ft. wide, and another across one end at the same width, was concreted and the large T-shaped area so obtained provided the base for all the firm's machinery. Windows, each 10-ft. high by 5-ft. wide, were cut into three sides of the building, thus affording excellent daylight to all the benches (Fig. 2), which were arranged round the outer walls on the original wooden floor. A scale plan was prepared in advance for the complete layout of machines and benches, and after much discussion and alteration, a definite plan was finally agreed upon and strictly adhered to (Fig. 3 (a)). This procedure proved to be invaluable when removing from existing premises began.

Other accommodation

Meanwhile, at the front end of the building, and up one flight of steps, the existing projection room was decorated and furnished and converted into a canteen (Fig. 3 (b)), suitable for about 30 people. A film-winding room on the same floor was equipped with cooking facilities and a serving hatch was cut into the dividing wall. The general set-up of this most important section is very smart and comfortable and much appreciated by the firm's

FIG. 1.—*Front of the "Empress" cinema, Bradford, now that the premises have been converted for use as a master patternshop.*

* The JOURNAL is indebted to Mr. H. W. Griffiths, honorary secretary of the West Riding of Yorkshire branch of the Institute of British Foundrymen, for drawing attention to this interesting conversion.

FIG. 2.—*General view of what was the auditorium, and which at present forms the main shop of Holroyd & Hall, Limited. The illustration gives a good idea of the transformation which has taken place; steel-work at normal roof height is used to carry stocks of pattern timber (unfortunately the original ornamental flowered ceiling cannot be seen).*

personnel. The office accommodation is also located on this floor, with windows overlooking the main floor of the works. No structural alterations were made beyond increasing the window area, serving also the canteen and office.

Outside, around the sides and rear of the cinema (where patrons formerly queued for the cheaper seats), the land and path were converted into a private car-park, with a suitable entry for lorries delivering goods, timber, etc. Part of this land has been covered over to provide a store for the timber, although the bulk of the timber used by the firm is stored inside the building on an overhead platform of rolled-steel joists (the uprights are visible in Fig. 2). No timber at all is allowed on the shop floor other than that of work in progress.

The original heating system in the cinema (hot-water pipes and radiators, using a gas-fired boiler situated in a small cellar) was retained and augmented by extra radiators to maintain the temperature required.

Removal to New Premises

In order to minimize loss of production, the move from the old premises some three miles away was no hurried affair. The firm had long made a practice of duplicating plant wherever possible and this fact enabled them to instal a considerable amount of machinery in the new premises before any large-scale removal actually took place. In effect, one set of machines was taken out of service and installed (like chessmen) on the marked-out floor of the new shop. When this operation was complete, the next weekend saw all the firm's patternmakers arrive (each man with his tools and bench and every man responsible for his own things). A small army of electricians worked over that weekend and fixed up the remaining machines and by the Monday morning, there had been a complete "change of programme" in the cinema and it was almost "business as usual" for the patternmakers.

Present Set-up

Holroyd & Hall employ a staff of about 30 and make all types of patterns, including precision pattern-equipment for production moulding by sand or shell processes, the patterns being made in steel, cast iron, gunmetal and aluminium. Metal-working plant (Figs. 2 and 3 (a)) includes three centre-lathes, one capable of turning 60-in. dia.; vertical and horizontal milling machines, a shaping machine and that "maid of all work," a Wadkin pattern miller. The wood-working section is equipped with two twin-disc sanders with 30- and 36-in. dia. discs, a bobbin sander, two over-and-under planing machines, two bandsaws, six wood-turning lathes (several capable of turning up to 8-ft. dia.), a circular saw, various pillar drills, etc.

FIG. 3.—*Further illustrations of Holroyd & Hall's premises, showing working methods and also typical productions: (a) Machining operations in progress in the "metal" section; (b) part of the canteen; (c) selection of all-metal pattern equipment, and (d) typical examples of miscellaneous patterns and coreboxes made by the firm.*

The majority of the firm's patternmakers are skilled in either wood or metal, and with a few exceptions, all were apprenticed with the firm, as indeed was the present management. The firm is "alive" to their responsibility for training young people, and personal attention is given to all apprentices.

Reflections on a project which to the firm itself is now past history, have led them to the following conclusions. A cinema can be adapted successfully to industrial uses and in the case described, costs were about one third of those for new premises. The firm pay tribute to their staff who gave so much assistance in the project, and who were not afraid of "rolling up their sleeves."

It is possible that large concerns or organizations could well treat the foregoing as of small consequence, but to smaller firms like Holroyd & Hall, the undertaking was a major one. Ending on a lighter note, the firm pride themselves on the fact that they have probably the only patternshop in the country with a flowered ceiling, and to those readers who are interested in a conversion of this type, they offer an invitation for them to visit the new patternshop and to see at first hand just what has been accomplished.

ON THE RECOMMENDATION of the Board of Trade the Treasury, under section 6 of, and the fourth schedule to, the Import Duties Act, 1958, may issue directions that payment of the duties chargeable shall not be required. Articles affected include machinery, certain instruments and apparatus, and articles for industrial research. Details of the necessary procedure which must be followed may be obtained from the Board of Trade.

AN ORDER has been placed with Thomas Smith & Sons (Rodley), Limited, by the British Transport Commission for six level-luffing electrically operated portable cranes for use at Bentinck Dock, King's Lynn (Norfolk). The cranes will normally operate at a maximum load of 4 tons, but two of them will be capable of lifting single loads weighing up to 7½ tons. All six cranes will be equipped for the discharge of bulk dry cargoes by grab.

Accident-prevention Poster

Presentation of Prizes

First, second and third prizes in the "Caption this Poster" competition, organized by the Royal Society for the Prevention of Accidents as part of National Industrial Safety Week (September 29 to October 4), were presented to the winners last week at the Charing Cross Hotel, London. Mr. W. L. Jones won both first and second prizes of £50 and £20 for his captions "Clear 'sitedness' prevents falls" and "He'll Tumble to it!" Mrs. M. L. Hunter won the third prize of £10 for her entry "Don't Do It Yourself." Cheques for the prize-money were handed over by Sir Howard Roberts, C.B.E., D.L., J.P., president of the Society. HM Chief Inspector of Factories, Mr. T. W. McCullough, also attended the prize-giving ceremony. Mr. Jones's achievement is specially noteworthy for the reason that his captions were selected by the judges, under conditions of strict anonymity and impartiality, from over 20,000 entries. Ten consolation prizes of £2 were also awarded in the competition.

Interest of Small Firms

The very encouraging response to the poster competition is indicative of the growing interest that industrial employees have in accident-prevention problems, and this atmosphere of "awareness" is testimony to the vigour and sincerity which safety-minded managements place behind their accident-prevention policies. The winner of the major prizes, Mr. Jones, in acknowledging the awards, drew particular attention to the high degree of safety consciousness amongst his own firm as being typical of that of a great number of small firms. Only too often, he said, good work by the smaller units of industry went unheralded and unsung. Thus, he accepted the prizes the more gratefully because the competition had focused attention on the efforts of his colleagues, and the staff of other small firms, in the direction of increased safety.

IBF Australia (Victoria) Branch Meeting

The annual general meeting of the Australia (Victoria) branch of the Institute of British Foundrymen was held in October at the Metallurgy Theatre, Royal Melbourne Technical College. Following completion of the business of the meeting, Mr. H. A. Stephens presented a paper entitled the "Position of Moulding Sands in Victoria," in which he dealt with the properties required of sands for moulding, methods of making moulds from sand, as practised in Melbourne, and the sands available for this purpose. The ensuing discussion was followed as usual by a light supper.

European Pressure-die-casters visit Britain

Representatives from eight countries—Spain, Holland, Sweden, Denmark, Italy, Germany, France and Switzerland were among members of the European Pressuré Die-casting Committee who paid a three-day visit to London recently, when they examined various technical and economic aspects of die-casting.

Included in their itinerary was a visit to the die-casting shops of Sparklets, Limited, of Tottenham. There, seventeen members were received by Mr. A. A. Millard, director and general manager, who is also a member of the Committee. During a tour of the factory they saw the firm's zinc, aluminium and soft-alloy die-casting foundries and commented favourably on the finish of the castings shown to them. During their stay, arrangements for the next International Conference were discussed. This will probably be held in Stresa, Italy, in May of 1960. The members were also guests of the Zinc Development Association, the Consolidated Zinc Corporation and Fry's Die-castings Limited. They also saw the new foundry of the Wolverhampton Die-casting Company, Limited.

Newton Chambers' Work for Durgapur

Two Wellman inactive hot-metal mixers, each of 800-tons capacity, have been made by Newton Chambers & Company, Limited, Thorncliffe, near Sheffield, for the £100,000,000 steelworks being constructed at Durgapur, India. The mixers weigh about 188 tons each and are 21-ft. o.d and 37-ft. long. They were fabricated to the design of the Wellman Smith Owen Engineering Corporation, Limited, one of the members of the British Consortium concerned with the India project. When all the steelwork for the mixers was completed, one of these mixers was assembled at the Thorncliffe works as a complete unit. This "proving" process was completely convincing. As the structural parts had been made from templates and all holes drilled before assembly, it was remarkable that it was unnecessary to alter or ream a single hole. Newton Chambers, as sub-contractors to the Wellman Smith Owen Corporation, are also making for Durgapur works transport equipment such as 90 ingot-casting cars, 260 charging boxes, charging-box bogeys, and structural steelwork for six 150-ton ladle cranes.

Birlec/Efco

A new company, Birlec-Efco (Melting), Limited, has been formed by Birlec, Limited, and Efco, Limited, for the design and supply of all types of electric melting furnaces, for the ferrous and non-ferrous metals industries, together with smelting furnaces and induction-heating equipment. Its offices are at Westgate, Aldridge, Staffs.

It is announced that the board of the company comprises Mr. George P. Tinker (chairman), Mr. J. C. Howard (managing director), Mr. F. S. Leigh (assistant managing director), Mr. D. L. Campbell, Mr. J. H. Crossley, Mr. P. F. Hancock, Mr. J. A. Monks and Mr. T. G. Tanner. The secretary of the company will be Mr. J. C. Mantell.

THE AMERICAN FOUNDRY INDUSTRY in 1954—a relatively poor year—bought $71,000,000's (about £25,000,000's) worth of patterns from master pattern-makers.

*Craft Apprentices' Corner**

More about Bedding-in . . . .

. . . . with "Tubal Cain" on the Job!

Well now, young fellers, how did y'get along with that there bedded-in job I gave you some time ago? † Shouldn't have been much trouble y'know, bit strange maybe, but certainly not difficult. After all it was only a simple example, but it served to demonstrate the principles of the method in a simple way. Obviously, however, all bedded-in work don't come so easy as this, and there's a lot more to bedding-in than just tying a couple o' patterns on your feet an' walkin' across a sand heap with 'em!

Big stuff . . .

Most of the bedded-in work done is big, heavy stuff, an' it's done this way more for convenience than anything else. It saves havin' a great big moulding box, an' lifting it, an' rolling it over; and you haven't always *got* the crane-power, remember. You'll appreciate, o' course, that on this heavy bedded-in work a lot o' things have to be thought about. There's the pressure of the molten metal on the sand of the mould, the manner of securing the cope against the tremendous "lift" of the metal, ramming the underside of the mould, venting the face of the mould, and so on. You have to make preparation for all these things an' a lot more besides, an' a lot of artful dodges are thought up from time to time.

. . . needs a permanent pit . . .

Starting with the pit itself, foundries which specialize in this type of work often have permanent pits, the sides bricked, plated, or concreted. Right down in the bottom of the pit they have a good ash bed a foot or 18 in. deep, and vent pipes three- or four-in. dia. lead up from the ash bed to a distance a little above the foundry floor. They cover the ash bed with a good layer of straw or wood wool or even shavings (to prevent the loose sand getting into the ashes and choking the air spaces), and over the top of this straw layer they ram in the sand which actually forms the "working bottom" of the pit. This sand layer may be a foot thick *after ramming*, so you can see there's plenty of work before you even start moulding operations.

. . . made doubly secure; . . .

That's not all of it; what about preparations for holding the cope secure against the upward lift? This again is always done from the bottom of the pit. Usually they lay in some really heavy iron bearer bars, right across the pit and well down below the ash bed. Each of these bearers will have two cast-in steel staples (one at each end) and these staples run up the sides of the pit to floor level. Sometimes separate bearers are discarded in favour of a good, heavy grid which will cover the bottom of the pit, but even so, such a grid will still have the staples either cast-in or screwed-in as before. With a concreted pit, the bearers can be laid in place and the concrete poured around so that the staples are actually in the concrete. Y'see, all of these methods are really only practical adaptations of the same principle, bearing in mind that the chief requirements all the time are soundness, security, and strength.

. . . if metal does get away . . .

Just the same when they actually start moulding —the bottom of the pit *must* be sound and secure —if that bottom gives way anywhere or at any point, then the molten metal will get through and just drain away. And don't think this never happens, 'cause it *does;* more often than moulders like to admit, too! They call it "getting away," and if you hear someone say he cast a job which "got away through the floor" you'll know what he means. A peculiar thing about metal "getting away" is that on some occasions it will blow the cope part and all the tackle clean through the roof, yet at other times it will just drain quietly away without a murmur—and you find you've poured maybe 20 tons of iron into a mould and haven't got a damned thing to show for it, except maybe a thin skin clinging to the side walls.

. . . queer things can happen.

Y'know "getting away" can be a very strange thing, and have some very strange consequences, too. I remember one time when old Ernie Russell made a big motor base in the floor, and it got away. The metal got right away into the sewers, it did. The story goes that afterwards they took sixteen people to hospital with scalded backsides, but I don't believe that part of it.

Bottom, . . .

Getting back to the actual moulding. Once having made the bottom sound, the pit moulders will take great care to give it a real good venting

* As before in this series, the popular jargon of the foundry floor has been retained in order to preserve the freshness of the article. Apologies are made to translators—EDITOR.

† See page 503, October 23 issue of the JOURNAL.

Craft Apprentices' Corner

with a thick vent wire, and every vent hole will need to be clean and go right down into the ashes. Only then will they start the actual bedding-in, and according to the shape of the underside of the pattern they'll pile the sand here and cut it away there so that when they bump the pattern down they'll have a more or less uniform density of ramming.

. . . ribs, faces and vents are arranged; . . .

In many cases, there will be certain ribs, and faces, and core-prints made loose from the pattern so as to help with bedding, and also, of course, with sleeking and finishing. Very often it is necessary to have the pattern in and out of the pit as many as half-a-dozen times to get the bottom face just so-so. Again, they may have to get right down on their knees at the side of the job and ram under the bottom with a hand rammer. It all depends on the job. Then, of course, they'll have to vent the bottom again with a smaller size vent wire and "blind" each vent at the face of the mould, before they replace the pattern for the last time. Only then can the moulders go ahead with ramming the sides of the mould, putting in strengthening irons, and grids, and packing on the core-prints, and downgates, ingates and all that, until finally they get up to floor level and make the joint.

. . . copes need locating . . .

Next the cope box can be set in place and staked and rammed-up, usually with a "boat-load" of lifters to help carry the weight of sand. As a rule there's pretty fair of overlap on the cope box—a foot or more left all around the pattern is nothing out of the ordinary, it gives a good bearing surface, y'see. And then after this they've to strip the pattern and sleek and finish the mould; believe me there *is* some finishing to be done—brads to be put in, needle-wire venting, patching, sleeking, blacking, drying, etc. Even after drying, there's umpteen cores to be laid and made secure, and the cope closed on and the job made ready for pouring.

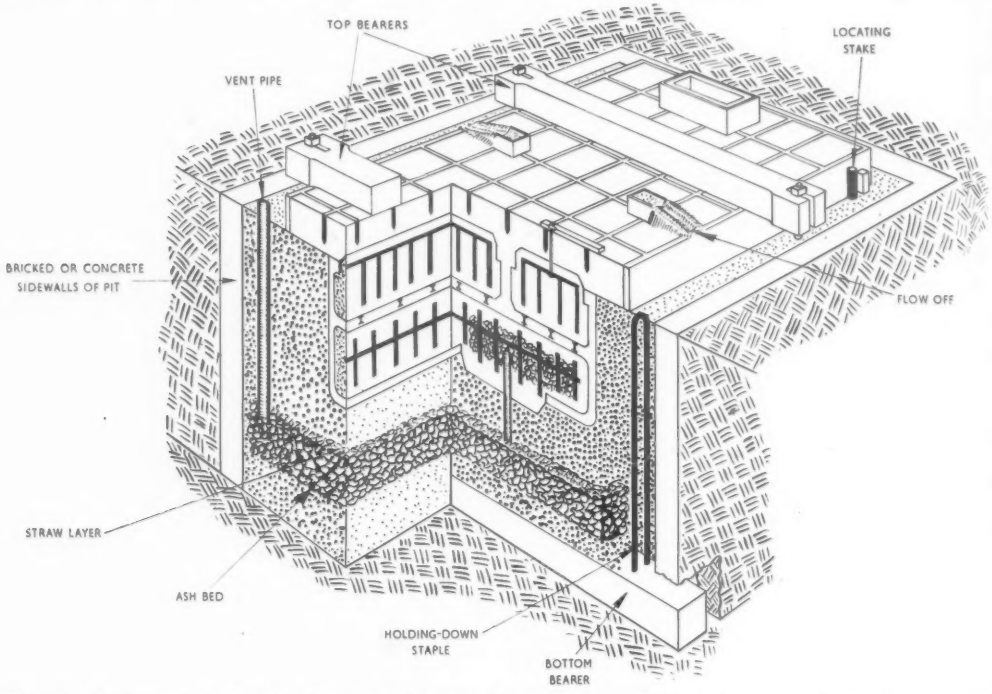


FIG. 1.—*Part-cutaway sketch of a bedded-in mould for a large casting. Such moulds are almost invariably made in deep brick- or concrete-lined pits.*

. . . and holding down.

The cope is held down with heavy iron bearers, three or four laid right across the box and bolted down to the staples leading from the bottom bearers or grid with hook-bolts (and they *don't* use mere ½-in. dia. bolts). And when everything is ready pouring can commence, sometimes from one end but more usually from a ladle at each end.

It's a general rule on heavy work to run a quantity of metal "through" the mould, that is, a couple of the riser bushes on the feeder heads are made up a little lower than the rest, and a channel of sand is led from each of these risers over the edge of the cope and on to the floor, so that cold metal from the top surface of the casting is carried away through the riser and replaced with hotter metal.

Well, there y'are then young fellers, that's bedding-in. I'm not expectin' you to be makin' this sort o' work just yet, leastways not workin' on your own—can't have you tryin' to run before you've learned to walk. I'll have you in the big shop for a spell with Herbert or old Ernie a bit later on, but it's just as well for you to know what has to go into this sort o' work, an' to understand the reasons for it beforehand, so that when the time comes you'll be good an' ready, an' better able to see that it's necessary to do certain jobs in certain ways, an' in accordance with the tackle available an' the general conditions under which the work is made in the particular shop. Think about it for a while, young fellers; just you *think* about it.

Brush Turbine and Hawker Siddeley

Resulting from the consolidation of companies within the Hawker Siddeley Group, Limited, the turbine division of the Brush Electrical Engineering Company, Limited, Loughborough (Leics), is to be transferred to Gloucester. The change will effect 400 workers, and although it is hoped to absorb most of them into other work, some key men will have to be switched to Gloucester. The turbine division of the company has been in operation for some 58 years and is one of the oldest sections of the company.

Explaining the changes within the Hawker Siddeley Group, Mr. B. L. Goodlet, managing director of Brush Electrical Engineering, says that they will result in the centralization of turbine and turbocharger production at Loughborough and elsewhere. A new turbine works will be established in part of the Gloster Aircraft Company, Limited, factory at Gloucester. He adds that the space vacated at Loughborough will be reorganized for the long-term expansion of the electrical machines division, and the manufacture of other products as may be necessary.

Iron and Steel Production—1951-1958

In the House of Commons last week comparative figures by months for the UK production of iron and steel in 1951 and 1958 (to October) were given by SIR IAN HOROBIN, Parliamentary Secretary to the Minister of Power, in reply to a request by MR. ARTHUR LEWIS (Lab.).

On the basis of January, 1951=100, the figures are as follow:—Pig-iron: January, 100-148; February, 102-149; March, 101-146; April, 97-140; May, 100-136; June, 100-133; July, 100-124; August, 99-121; September, 103-126; October, 104-132. Crude steel: January, 100-133; February, 107-140; March, 104-141; April, 105-133; May, 100-124; June, 101-122; July, 84-103; August, 87-98; September, 99-121; October, 98-119.

Publications Received

Report on Nationalization. Published by the Federation of British Industries, 21, Tothill Street, London, S.W.1; price 5s. post free (excluding air mail).

When an accountant produces a firm's balance sheet, he records figures, the significance of which is left to the chairman to expound to the shareholders on the occasion of the annual general meeting. This report resembles an auditor's statement, but it is extensively annotated, these side notes being based on ascertained facts. It is up to the politicians or the daily-Press headline writers, to stress the items which will further their political party interests. It is a feature of democratic government that each party places its views to the electorate to attract as much support as it can. When in office, however, the implementation of policies by Acts of Parliament is constantly criticized by the opposition and sometimes by supporters. This report has given the reviewer the impression that criticism of the action of State monopolies is difficult as control must be in the hands of the Boards which operate them. The responsible Minister can only deal with policy, as the Boards control operation, pricing and finance, and labour relations. The book, which runs to 68 pages, is divided into four chapters:—the arguments for nationalization; the record of nationalization; free and nationalized industry contrasted; and the acquisition of equities: nationalization by the back door. For the busy man there is an excellent summary, set out in such a manner that easy reference can be made to any particular point. An appendix carries a number of tables detailing the progress registered by all the major State monopolies except Her Majesty's Post Office. The report is certainly amongst the best ever produced by the Federation.

Kestner Golden Jubilee Book. Published by the Kestner Evaporator and Engineering Company, Limited, Grosvenor Gardens, London, S.W.1; printed for private circulation.

The most interesting part of this book is its foreword by Mr. Arthur J. Reavell, the founder of this company 50 years ago and still its chairman. To Mr. Reavell's contemporaries, his reminiscences will bring back memories of the times when individuals, not committees, controlled business organizations. Mr. Reavell must have been amongst the first to realize that scientists and technologists had a right to a seat in the boardroom of manufacturing concerns. It was he, apparently, who convinced Lord Stamp that it would be of advantage to the railway companies to have a scientist in a key position, and as a result Sir Harold Hartley was made a vice-president. This notion has been extended and to-day many scientists find themselves in key positions in industry. There is not much mention of the Lennox Foundry in the book, yet this concern was amongst those which pioneered the production of high-silicon acid-resisting cast iron. The other sections of the company are covered in considerable detail in the book, which runs to over 100 well-illustrated pages. Unlike some other publications covering golden jubilees, this one is well indexed.

Centro de Industriales Siderurgico—Memoria 1956-1957. Published by the Centre fron Avenida Belgrano 1613, 8th Storey, Buenos Aires, Argentina.

This is an excellently presented annual report of the iron and steel industry of Argentina. The illustrations are of high standard and the tabular matter is beautifully set out. The foundry industry is not included in the survey, however.

UK Export of Scrap freed

In agreement with the Ministry of Power, the Board of Trade has announced the issue of an open general licence* permitting the export to any destination during the period December 5, 1958, to February 4, 1959 (inclusive), of iron and steel scrap not exceeding an f.o.b. value of £25 per ton. The licence specifically excludes material derived from armour-plate or from military equipment described in Group 17 of the Export Control Order, and firms wishing to export such scrap should make application to the Export Licensing Branch of the Board for individual licences giving particulars as to the origin, location and exact present state of the material and the name and address of the consignee or ultimate purchaser. The open general licence will not be extended and exports arranged for shipment after its expiry date will not be permitted, it is officially stated.

Ironfounders' Viewpoint

The effect of this open general licence is to permit for a limited period, the free exports of basic grades of iron and steel scrap, while protecting home requirements of high-value alloy-steel scrap, particularly stainless-steel scrap. It is clear from consultations in well-informed quarters that, resulting from the new "freedom" to export, UK ironfounders are apprehensive that they may lose to continental buyers valuable high-grade machinery scrap (of which they allege there is no great surplus at present in this country) solely on account of higher prices at present ruling abroad. An important difference between the Board of Trade statement reproduced above and that of the Paymaster-General in the House of Commons earlier last week is that the former states that the two-month period will not be extended, whereas Mr. Maudling said the future of scrap exports would be reconsidered early in the New Year.

After the announcement this Autumn that the Government would license the export of a limited quantity of iron and steel scrap, the Council of Ironfoundry Associations consulted with the Iron and Steel Board on a problem that appeared to have arisen through the accumulation of excess stocks of steel scrap. The CFA had no evidence that any similar excess of cast-iron scrap had revealed itself.

So far as the ironfounding industry was concerned, there was no dissent from the general opinion, that there was in fact an excess of steel scrap at that time, and that limited exports over the next two or three months might be possible. But this was not agreement that the Government could safely issue an open general licence for the export of both iron and steel scrap. All this was made clear to the Iron and Steel Board, in addition to the following views held by the CFA:

(1) If the export of cast-iron scrap was allowed to continue, either a shortage, or an increase in price, or both, would result, because overseas prices were higher than the late controlled prices in the United Kingdom over most if not all of the foundry grades.

(2) Under the existing licensing arrangements there was evidence of rising prices for certain grades in several localities.

(3) Cast-iron scrap was essentially capital scrap and constituted a reserve which could be lost as a result of exports.

(4) There was evidence of some recovery of production in the foundry trade, which might possibly go further in the light of the Government's very recent pronouncement about capital expenditure. This could quickly accentuate any shortage.

(5) Ironfounders habitually used a mixture of pig-iron and cast-iron scrap in the proportions which were best from the point of view of technical efficiency and lowest cost. Any shortage of cast-iron scrap in the grades normally used would therefore result in lower efficiency and/or increased cost. The trend to increase the proportion of scrap to pig-iron in recent years was due to a steady endeavour to cheapen the mixture rather than to any abnormally low price of scrap iron, and it would persist so long as there was any price difference between scrap and pig. In the present situation of lack of demand and keen competition, the use of scrap in place of pig was certain to go as far as technical considerations and the availability of scrap permitted.

(6) It had been argued that ironfounders could prevent the export of scrap by offering higher prices than at present obtained. This could only mean an increase in founders' costs. At the present time, profit margins were so reduced by lack of demand that there would be no alternative but to pass these on to their customers in the engineering industries, many of whom were encountering keen competition in export markets.

To sum up, there was some evidence of a hardening in scrap prices, and there were strong arguments also against dissipating home stocks through an overgenerous export policy. These factors were linked in turn with signs of recovery in the founding industry and, if demand were to show any marked upward tendency, a scrap shortage might speedily become apparent at the foundries.

Present Position

Table 1, showing average internal prices per long ton (2,240 lb.) for cast-iron scrap in cupola sizes ruling on the Continental mainland during the month of October, may be of interest. All prices, except those quoted for Germany and Italy, are f.o.r. The German and Italian prices include delivery charges to certain places in those countries. The figures are based upon the results of enquiries made by the European Committee of Foundry Associations, of which the CFA is a member.

TABLE 1.—*European Prices of Cast-iron Scrap in October.*

	Medium	Heavy Machinery
	£ s.	£ s.
Austria	11 4	15 4
Belgium	13 15	17 1
France	13 16	17 9
Germany	13 8	16 17
Italy	17 3	20 13
Netherlands	12 3	15 1

The CFA is still resolutely opposed to the release of cast-iron scrap for export at the present time, for the reasons given above. In order to assist in dealing with what is inevitably a complex matter, it would be of great help if member-firms of the CFA faced with any difficulty in acquiring scrap would at once inform the secretary. At the same time, evidence that ironfounders themselves are contributing to a solution of the problem by increasing their stocks of scrap both in their own and the national interest would strengthen the CFA in its efforts to prevent the scrap being exported. It is reassuring for ironfounders to learn of the Board of Trade's insistence, referred to earlier, that the freeing of scrap exports is only to last two months; the state of trade at the end of that period could quite easily indicate the unwisdom of further depletion of the country's valuable raw materials.

* Enquiries about this licence should be made to the Board of Trade, Export Licensing Branch, Gavrelle House, Bunhill Row, London, E.C.1 (telephone MONARCH 4071). Copies of the Open General Licence (price 2d. each) may be obtained from H.M. Stationery Office, Kingsway, London, W.C.2, and branches.

Notes from the Branches

Lancashire

Members of the Lancashire branch of the Institute of British Foundrymen met for their November meeting at the Midland Hotel, Manchester, to hear Mr. H. Pinchin speak about "Practical Experiences of making Moulds in a Mechanized Foundry." A series of excellent slides was used by the author to illustrate his talk.

The discussion which followed the lecture was opened by MR. H. HAYNES, who asked if the author used a formula to balance his core-irons.

MR. PINCHIN replied that he had no formula for designing balancing core-irons—only experience. Usually a trial grid was made and then modified as necessary.

A MEMBER said he was pleased to note that good quality patterns were used, and asked if resin patterns had been tried.

MR. PINCHIN said his firm had carried out experiments with resin patterns and hoped to use them shortly.

MR. HALL mentioned that a railway foundry at Crewe used resin patterns to produce thousands of castings.

MR. PINCHIN pointed out that the main risk of damage to resin patterns appeared to be from the handling not from ramming by Sandslinger.

MR. GOUGH asked at what point the author would recommend changing from wood to metal patterns in quantity production.

MR. PINCHIN said it depended upon the quantity required and also on delivery dates. For pipe-specials —the patterns for which formed the bulk of their wooden patterns—he would say half-a-dozen, if a rush of orders then followed, it would be best to use metal patterns, especially with those used in conjunction with stripping plates.

MR. GOUGH then asked if resin patterns were used would it be to replace wood or iron?

MR. PINCHIN said he did not know yet to what extent resin patterns could be adopted, the decision would depend upon the relative costs.

MR. F. NIELD wanted to know if core-sand returns were checked, and what was the maximum depth of unsupported sand which could be lifted in a mould.

MR. PINCHIN replied that the proportion of returned core-sand was not known, neither did he know what the maximum depth of unsupported liftable sand would be, but actually a 12-in. depth of sand below bars had been picked up on occasions. Much depended upon the type of box and pattern used; with a pattern containing tiny "cods" of sand perhaps no more than ¾-in. of sand might be picked up. The sand his company used required no venting as it had high permeability and a low coal-dust content.

Slinging

MR. H. BROADBENT asked if the slinger heads were adjustable, and if they were not how then was ramming adjusted. He also asked if the bars of box-parts were chamfered?

MR. PINCHIN said the "heads" were not adjustable, the maximum ramming depth was around 5 ft., but this he contended was no different from ramming at 1 ft. depth, as the downward velocity of the sand did not alter with depth. Permeability tests had revealed no real difference in ramming density of moulds; ramming permeability, however, varied with the size of the ramming head. In reply to the second part of Mr. Broadbent's question, he said that the bars were chamfered as were also the cast-iron boxes at the top edge.

A further question from Mr. Broadbent as to whether a naturally-bonded sand plus clay was used, elicited the reply from Mr. Pinchin that clay additions were controlled by regular checks, but the strength was not as great as might be expected—if green-strength was kept low, permeability would be high.

MR. F. NIELD asked why the exothermic sleeves which had been illustrated were made up of two sections.

MR. PINCHIN said that this was done so that a single box could be used for moulding them and, if necessary, several sections could be used to make up the desired size of sleeve.

The meeting concluded with warm support from members for the vote of thanks to the lecturer, proposed by Mr. Collinge and seconded by Mr. Coates.

London

More than 120 members and guests attended the meeting of the London branch on November 19 at the Constitutional Club, Northumberland Avenue, London, W.C.2. The lecturer for the evening was Mr. J. S. Turnbull of Lake & Elliott, Limited, of Braintree, the title of his paper being "Precision Sand Casting." During the course of his talk, Mr. Turnbull said that investment founders had much to learn about the technology of steelfounding. In order to obtain steel and other castings which would reduce, or eliminate, man/machine hours, it was necessary in some measure to combine the versatility of the sand foundry with the technology of the investment foundry. He described in detail the Alphax process of precision sand casting and pointed out that new foundry processes would be used only if designers had confidence in the metallurgical soundness of the castings produced and were aware of the advantages which castings offered. Apart from the new moulding techniques, Mr. Turnbull drew the attention of his audience to the fact that to give real satisfaction to engineers prepared to adopt new methods and designs, patternmaking required better materials and machinery and castings required purer, gas-free liquid metal.

A lively discussion followed the lecture, the first question being asked on the economics of precision sand castings; had Mr. Turnbull not considered using the CO_2 Process? Mr. Turnbull said that he had only a limited knowledge of the CO_2 Process, but thought that the use of sodium salts in the sand might cause difficulty. The Alphax process he had described was a hot-mould process, cold processes needed more feeder metal, so that there was a saving there. Another speaker, referring to the process described by the Author, thought that the hot moulds might also produce a coarse structure in the castings, with the result that impact results were bad. He thought that vacuum casting might help and also the use of grain refiners. Asked about the possibility of using a hot CO_2 mould, Mr. Turnbull said that when using a CO_2 hardened mould, there was a weak zone when the temperature went up. With a hot mould, it was better to depart from silica-base materials. A further speaker said that Mr. Turnbull had done good service by pointing out the value of zircon sand; initial cost was not so important when it was possible to reclaim. He considered that the use of CO_2 with a zircon sand might prevent reclamation but under these conditions the use of a phosphate binder might be interesting. The lecturer said that aluminium phosphate gave the best refractory bond. Another member inquired about casting tem-

Notes from the Branches

perature and breakdown; to this query Mr. Turnbull said that the casting temperature of the mould depended on the section of casting. For obtaining best permeability, he had found that the temperature range 750 to 800 deg. C. was to be preferred but some moulds could be cast as low as 400 deg. C.

Accuracy

Replying to a question on dimensional accuracy, the lecturer said that in precision sand casting by the Alphax process, the dimensional accuracy was slightly less than investment casting, say plus or minus 0.007 in. per in., but this bold statement really skated over the question of variables. In his view, insufficient accuracy was rarely reason for scrapped castings. Asked whether he had had any experience with centrifugal casting into Alphax moulds, the speaker replied in the negative. However, the Investment-X process was suitable, but only low speeds were used. He thought that the Alphax mould would be quite suitable, but centrifugal casting itself brought added complications. A question was asked as to why 10 per cent. of castings production was scrapped when using the Alphax process, and the speaker explained that the process was but two years old. Among reasons for scrapped castings were "short runs" if the metal and moulds were not sufficiently hot, in this event pyrometers were often at fault (this could cause five per cent. of the scrap). In addition, the mould temperature was critical, effect of inclusions and cracked moulds also were conducive to scrapped castings. Still on the subject of the Alphax process, another member wanted to know if it could be extended to the manufacture of large castings and other metals. Answering, Mr. Turnbull said that a steel casting weighing 1 cwt. had been made, and that pure H.C. copper could also be cast satisfactorily by the process.

Mr. J. F. Kayser proposed the vote of thanks, saying that credit was due to Mr. Turnbull and others of his calibre for the great work they had done. Mr. W. Pym seconded and particularly congratulated the lecturer on the way he had dealt with the questions.

Coventry

The second annual dinner/dance of the Coventry section of the Birmingham branch of the Institute of British Foundrymen, held at the Hotel Leofric on November 21, attracted an attendance of over 250, which, as the section president, Mr. B. R. Pearson, said, was "excellent support." He went on to say that although not yet old enough to reminisce, the section was becoming "part and parcel of technical activities in Coventry—it was passing out of the weakling stage." The area covered by the section included the Coventry district, Kenilworth, Warwick, Leamington, Rugby and Nuneaton, and in this area, he said there were approximately 12 foundries and 35 patternshops; yet the section had a following that compared favourably with most others.

The Institute, he added, tried to teach younger members some of the technicalities of their work, and endeavoured to serve the industry as a whole. The presence of the, then, principal of the Coventry Technical College at the section's dinner last year, had proved no empty gesture, as since then full co-operation had developed between the College and the section. Firms in the area were co-operative, too, and this was an invaluable help, for the present success of some companies had been inspired by the co-operation of those who wished to foster the interchange of ideas within the industry.

Outlining someof the work of the National Foundry College, at Wolverhampton, where he is senior lecturer, Mr. J. B. McIntyre said at the dinner that there were strong links between the College and Coventry. From 4,500 foundries in the country the College selected in one year only 66 students to be trained for senior positions in the foundry industry, and of these it had passed out 15 from Coventry since it began its work ten years ago. This was out of a total of 200 students who were now circulating within the industry. To keep students "well balanced," was one of the main aims of the College; he would much dislike anyone to think that the College turned out a standard product.

Dr. D. R. Fardoe welcomed the guests, who included Mr. A. E. Peace, president of the Institute of Foundrymen, and Mr. G. Lambert, the secretary.

South Africa

The branch president, Mr. R. C. Cross, was the chairman at the October meeting of the South African branch, when Mr. J. J. Marais, technical manager, G. & W. Industrial & Chemical Supplies (Pty.), Limited, delivered a lecture on the subject of foundry clays.

Mr. Marais introduced his lecture by stating that clays are the only natural minerals which exhibit the peculiar property of becoming plastic to any marked degree when brought into intimate contact with water, and which could then be permanently distorted into any shape by external forces and retain that shape and harden when dried into a solid mass. He went on to say that in order to identify to which main group a clay belongs to when being tested, it was not sufficient to rely on chemical analysis alone, as the clay might possess other non-clay impurities which would affect the analysis. He then outlined several simple methods of identification which, if applied with discretion, could be found useful. The tests as such were for plasticity or bond strength, loss on ignition, benzadine, and dye-absorption. The four types of clay used in the foundry industry he classified as follows:—kaolinites; illites; montmorillonites, and calcium/magnesium bentonites.

Concerning the calcium bentonites, the author stated that although these bentonites were often used for bonding sands for light-iron and non-ferrous work, they were less popular for heavy and iron castings, as they were of poor durability and, due to their low dry-strength, were more prone to washing and scabbing. On the subject of sodium bentonites, however, he said that the attributes which made them the ideal bond for foundry sands were:—(*a*) Their high dry-strength values; (*b*) their green-strength values were less sensitive to moisture variations, which, in most foundries, were difficult to avoid; (*c*) due to their high swelling nature, they tended to give the highest permeability values to a given sand and the lowest expansion values; and (*d*) less bond clay was required to recondition the sand because the durability of a sand was highest with sodium bentonite, *i.e.*, the sand did not burn out to the same degree as when bonded with other bentonites or clays.

Mr. Marais concluded his lecture with references to the newest developments concerning bentones which could be used in a small percentage to treat sand which, when wetted with an organic fluid, would result in the sand having green- and dry-strength similar to a water-bentonite mix. The ensuing discussion was concluded by a hearty vote of thanks being proposed to Mr. Marais by Mr. G. F. Alexander.

European Foundry Apprentice Competition: Comments on Last Month's Event

*By F. C. Hayes**

As already briefly announced,† a British foundry apprentice, Peter Warnes from English Steel Castings Corporation, Limited, Sheffield, was placed third in a competition to find the best European moulder/coremaker apprentice which was held in Paris at the end of November (the full results are quoted in Table 1). The event was organized by the training sub-committee of the European Committee of Foundry Associations, the membership of which includes foundry employer associations of Austria, Belgium, Denmark, France, Germany, Holland, Italy, Luxembourg, Spain and the United Kingdom.

Continental Views on Training

In preparing for the common market and, possibly, a free-trade area, continental founders regard the competition as a means of cementing the friendships among Western Europe and of checking up on each other's efficiency. In expectation of the lowering of trade barriers, there can be little doubt that each country is heavily investing in training, in order to safeguard, and if possible expand, its present markets. This was evident from the galaxy of important persons, including a Minister, at the official ceremonies held in connection with the competition and from the set-up of the Foundry Craft Training Centre at Bezons, near Paris, where the competition was held. This Centre, which cost no less than £800,000 to build and equip, is the largest of 70 similar ones throughout France and is the fruit of close collaboration between the foundry industry and the technical education branch of the French Ministry of Education. On the shop floor, which occupies 43,500 sq. ft., are set out a cupola, five other furnaces, moulding benches, mechanized equipment and all the necessary ancillaries. Around this area and on the first floor are shops for producing diecastings, patternmaking shops, laboratories, classrooms, showerbaths, etc.; there are hostels, gymnasiums and sports fields.

TABLE 1.—*Competition Results at a Glance.*

Number of competing countries: Six (UK, France, Germany, Holland, Italy and Denmark). Number of competitors: 15.

Place in Competition.	Name.	Points.	Home country.
First ..	Yves Personnic ..	127.11	France
Second ..	Ferdinando Bentivoglio	126.87	Italy
Third ..	Peter Warnes	121.93	UK
Fourth ..	Alain Barré	120.74	France
Fifth ..	Dieter Woestemeier ..	119.96	Germany

Number of team entries: Four. Order of placing: (1) France; (2) Germany; (3) United Kingdom; and (4) Holland.

This is not the place to dwell at length on the different approach to apprentice training which prevails on the Continent, but it seems to have been accepted at least by France, Germany and Holland that "Trade follows Training." They are concerned in their schemes with the achievement of high national *minimum* standards in craftsmanship and technology and the writer believes that the UK authorities tend to underrate the French efforts. Perhaps the difference in assessment of schemes arises from the fact that in France boys are apprenticed to the trade rather than to a company and hence, the French consider apprenticeship as part of the general educational system of the country.

Level of General Education

The integration of practical craft training with technology and general education was one of the critical features of the competition itself. Of the UK competitors, one (Peter Warnes) had gained his Ordinary National Certificate in Engineering, another had an Intermediate City and Guilds Certificate in Foundry Practice and the third had no record of technical-college success. Yet, apart from the practical test, the competition included papers in technology, foundry calculations, interpretation of technical drawings and an essay. Each of the British boys did well in some respects, but training proved to be no substitute for education, or yet was the reverse true, and though the UK boys were older than their rivals, experience proved no substitute for either.

The French, who won both the individual and the team prizes, combine all aspects of training and education under one roof and direction. Since they are only concerned with basic training from the ages of 14 to 17, the lack of direct production contact can, in their opinion, be made up later when a firm foundation has been laid. In the foundry industry, where a firm having more than 100 employees is the exception, this acquires special significance as it results in even the smallest foundry being provided with well-trained young people.

Teamwork

The UK team-placing—third out of four full teams entered, and behind France and Germany—was a just reflection of standard reached and, even had not one of the boys had an unfortunate accident in the preparation of his mould, the UK team would have been hard-pressed to reach second place.

The competition, incidentally, proved that it is possible to assess fairly both practical and written work in six different languages. Each casting and written paper was marked by *all* judges, each national group of judges submitting their marks to the chairman of judges appointed by the host country. Mr. Guerin, who discharged this exacting task very competently and with good humour, reported in his summing-up that the field had been very close (Michael Tobin, of Metropolitan-Vickers was placed seventh with but 0.06 points behind a Dutch boy) and commented on the far-reaching unanimity of the various national assessments in so far as relative placing was concerned. In absolute marks, the German judges proved to be most generous and the British the most conservative.

Other Remarks

The organization of such a competition presents considerable difficulties. It must be ensured not only that justice is being done at all stages, but that this is always apparent to those participating. There are also the many difficulties associated with any international gathering, but Mr. Dumay, the director of training of

* Mr. Hayes, who is the training officer to the Council of Iron-foundry Associations, acted as organizing secretary to the British delegation in Paris.

† See last week's issue of the JOURNAL.

European Foundry Apprentice Competition

the *Syndicat Général des Fondeurs de France*, and his staff, had apparently foreseen all of them and there were no hitches at any stage. Competitors, judges and observers enjoyed a full measure of the traditional French hospitality. Apart from the plaques, books and other presents with which the boys were showered, Mr. M. Hertzog, the French High Commissioner for Youth and Sports (and well-known for his exploits in the Himalayas) at the closing ceremony gave a free winter-sports' holiday to the first five.

The next competition will be held in the UK in the spring of 1960, and it is hoped that on that occasion not only will British founders be able to match their French friends in organization and attract national interest, but that the UK competitors will also continue the tradition that the host country (Germany in 1957 and France in 1958) carries off both individual and team prizes!

News in Brief

METALOCK (BRITAIN), LIMITED, casting-repair specialists, have opened a new office at 40-42, West Bar, Sheffield.

BAKELITE, LIMITED, announce that, following substantially increased demands for their epoxide resins, production capacity has been increased by 60 per cent.

ORDERS worth more than £1,000,000 have been received by Albion Motors, Limited, Glasgow, for the new range of Chieftain trucks introduced a few months ago.

NEARLY 40,000 PEOPLE from 41 countries visited the Electronic Computer Exhibition and Business Computer Symposium, which closed at Olympia, London, last Thursday.

UNITED DOMINIONS TRUST, LIMITED, announce the opening, next Monday, of a new branch office at 84/85 High Street, Chelmsford (telephone: Chelmsford 51561/2).

AVERAGE SELLING PRICES (calculated to the nearest 10s.) of members of the Association of Light Alloy Refiners and Smelters for the four weeks ended October 10 were:—LM1, £143 10s. per ton; LM2, £152; LM4, £169; LM6, £186.

FIRST STAGE was completed last weekend of one of the biggest development projects in the British steel industry—the installation at the Stewarts and Lloyds works at Corby, Northants, of a new mill capable of rolling well over 1,250,000 tons of ingot steel a year.

Mr. F. J. ERROL, economic secretary to the Treasury, said when addressing 80 Indian engineers, who are training at the Metropolitan-Vickers Electrical Company, Limited, Trafford Park, that he saw no reason why in a few years time India should not be the UK's largest market.

THE GEORGE COHEN 600 GROUP, LIMITED, announce that their offer to acquire all the 1,600,000 shares in the capital of G. Beaton & Sons, Limited, at the price of 4s. per share has been accepted by the holders of more than 91 per cent. of the shares and the offer has accordingly become unconditional.

A CONTRACT, totalling £10,500,000 for the design and construction of a gas pipeline from Kachsaran to Shiraz and a fertilizer plant at Shiraz, was signed last Friday with Constructors John Brown, Limited, which will share the work with two French firms. The plant will be the first of its kind in Persia.

GUMMERS, LIMITED, valve manufacturers, Rotherham, have warned about 10 per cent. of their 300 workers that shortly they will be working a four-day week, unless the order position improves. This is restricted to one department, and it is hoped that the short-time working will be only temporary.

IN 1953 the Walker, Newcastle-upon-Tyne, shipyard of Vickers-Armstrongs (Shipbuilders), Limited, employed only 34 apprentices; now the figure stands at nearly 200. This was reported by the company's personnel manager, Capt. J. E. Sissmore, when he spoke at the annual apprentices' prizegiving recently.

A NEW £100,000 LABORATORY to assist in the refining of nickel-bearing ores has been built at its Clydach works, Swansea, by the Mond Nickel Company, Limited. The new laboratory, into which some 50 chemists and samplers are moving, follows the recent £2,000,000 modernization scheme for the works.

THE BUSINESS OF IRONFOUNDING, carried on in Winsover-road and Mill-lane, Spalding, Lincs, together with the foundry premises, are being offered for sale by C. Stanton, Limited, by private treaty as a going concern. Also included in the sale are a house and a tenanted shop. The company have carried on this iron foundry for a number of years.

FOR FORMER REGULAR OFFICERS there was a better chance of getting industrial posts in the north than the south of England, said Col. M. W. Batchelor, chairman of the Regional Resettlement Committee in Sheffield, on December 5. He was speaking at a farewell tea to officers who had been attending a re-orientation course at Sheffield College of Technology in Pond Street.

FOLLOWING THE DEATH of the chairman, Mr. B. W. Smith, of Smith, Bingley & Evans, Limited, ironfounders and patternmakers, Birmingham, the company announces that there will be no material change in management. The working directors at present are Mr. J. F. Edwards and Mr. A. E. Bailey, and Mr. S. H. Smith and Mr. R. S. J. Smith act in a supervisory capacity.

THE SOCIETY OF CHEMICAL INDUSTRY announces that Dr. E. C. Potter and Mr. J. B. Cotton, who represented the corrosion group at the USSR Corrosion Congress last May, have now prepared a list, in English, of the titles of the 200 papers presented to the Congress. Copies of the list may be obtained by members of the group on application to the assistant secretary of the Society, 14, Belgrave Square, London, S.W.1.

PLANS ARE ANNOUNCED by Ruston & Hornsby, Limited, engineers, etc., of Lincoln, to spend a further £12,000 on a scheme for saving heating costs in its works and offices, following the expenditure of £15,500 during the past four years. The first expenditure is saving the company approximately £4,000 a year and a similar amount will be saved by the second part of the programme.

WHEN NEWTON CHAMBERS & COMPANY, LIMITED, Thorncliffe, hold their annual apprentices dinner and party on December 29, the guests will include Tom Finney, the soccer international, and Harry Hough, Barnsley goalkeeper, who started his football career with Thorncliffe Recreational Football Club. There will be a 40-minute film of the England *v.* Russia match in Moscow last February, and this will be followed by a football forum.

THE LORD MAYOR and Lady Mayoress of Bradford (Alderman and Mrs. N. W. Durrant) recently paid a visit to the Bradford engineering works of Hepworth and Grandage, Limited, where they were welcomed by Mr. G. Collin Hepworth, chairman and joint managing director, and Mr. J. L. Hepworth, joint managing director. The visitors were particularly interested in

News in Brief

the new offices and warehouse and the apprentice training school. They were later the guests of the directors at luncheon.

AILSA SHIPBUILDING COMPANY, LIMITED, Troon, Ayrshire, has received an order for a single-screw diesel-driven passenger and cargo ship, from the North of Scotland, Orkney & Shetland Shipping Company, Limited, Aberdeen. The vessel will be 270-ft. long and have accommodation for approximately 450 passengers. Provision will also be made for the transport of fresh fish in chilled holds and frozen fish in deep-freeze chambers. Deadweight capacity will be 1,000 tons and the service speed 16½ knots.

THE NORTH WESTERN GAS BOARD has sold its millionth gas cooker since vesting date nine and a half years ago. This means that every working minute the board's showrooms have been open for business a householder has bought a new cooker. Standing side by side the million cookers sold would reach from Wigan Pier to London Bridge and back—more than 400 miles. If stacked in an upright column with 75 gas cookers forming the base, they would reach 9ft. higher than the top of Blackpool Tower.

FULL-TIME WORKING was resumed this week at the Clydesdale Steel Works (Lanarkshire) of Stewarts and Lloyds, Limited. The No. 1 rotary forge mill is now operating to capacity, while the fourth open-hearth furnace has been restarted to meet orders for 5,000 tons of 18-in. pipeline from Venezuelan Sun Oil and for ingots from Argentina. It is expected that these orders will be completed by the New Year, when, unless further replacement orders are available, it is likely that a return will be made to short-time working.

A SPECIAL WINTER LECTURE, open to non-members, has been arranged by the Incorporated Plant Engineers for January 19 next, when Mr. D. L. Pratt, M.A. (CANTAB.), M.I.MECH.E., chief engineer of the Trans-Arctic Expedition, will speak on the engineering problems encountered by the expendition with particular reference to maintenance. The lecture will be given in the meeting hall of the Institution of Mechanical Engineers, Birdcage Walk, Westminster. Admission will be by ticket only and application should be made to the secretary, Incorporated Plant Engineers, 2, Grosvenor Gardens, London, S.W.1.

WOMBWELL FOUNDRY AND ENGINEERING COMPANY, LIMITED, Wombwell, near Sheffield, report that orders received and on hand in their plating and constructional-steel department, and for the squads of outside erectors, will keep those departments working to full capacity for some considerable time. The firm had a trading profit of £64,019 last year, compared with £78,513 the year before. This decrease was despite a record turnover, and was due to the general recession in trade and accompanying increasing competition. The fall in the demand for the products of the steel and tool departments and for some types of general castings was seriously felt.

THE ESTABLISHMENT OF AN INDUSTRIAL MUSEUM at the Abbeydale Works, Beauchief, Sheffield, was discussed at a meeting of Sheffield Museum's sub-committee on December 5. It was decided to ask the Minister of Works, Mr. Hugh Molson, to what extent his department was prepared to help in its establishment. If he gives an encouraging answer it is understood a scheme will be promoted. When the Minister visited the works in October he expressed the view that Sheffield as a prosperous city, should bear the greater cost of the preservation, but said that if it were proposed by the Ancient Monuments Board he would not exclude a grant to help carry out the scheme.

NU-WAY HEATING PLANTS announce that, following re-organization of its training facilities, Mr. H. W. Burbery, formerly the company's installation and service manager, has been appointed principal of the School of Oil Firing which the firm conducts at Vines Lane, Droitwich. Mr. Burbery is a veteran of the oil burner industry, having installed American automatic burners as long ago as 1923. The school was founded in 1952 to provide elementary instruction on the installation and servicing of oil burners for fitters employed by the firm's accredited dealers, and in the past six years more than 800 have taken this one-week course. (Details of the courses, which are free, may be obtained from the address quoted).

THE HEAVIEST LOAD ever shipped by British Road Services, Continental Ferry Service on one road trailer —a 47-ton wheel for a steel rolling mill—recently arrived at Tilbury, in the m.v. Bardic Ferry, *en route* from Munchen-Gladbach in the Ruhr, Germany, to Corby, Northants. The vessel is one of the drive-on drive-off ships operated by the Atlantic Steam Navigation Company's Transport Ferry Service. The consignment, 13 ft. 5 in. wide, was loaded on a 60-ton pneumatic-tyred low-loader trailer owned by B.R.S. (Pickfords), Limited, who organized the transit. The trailer, with its load, was hauled to Antwerp by a Continental road haulier, and on arrival at Tilbury was drawn off the vessel and hauled to its destination by a Pickfords tractor.

Thos. W. Ward Appointments

Mr. Arnold Carr, assistant managing director of Thos. W. Ward, Limited, Albion Works, Sheffield, has been appointed deputy chairman of the company. He joined Thos. W. Ward Limited, in 1915 as a commercial apprentice and was later attached to the foundry-supplies department, becoming a junior representative in London. He was appointed local director in 1936 and was elected a director in 1941, becoming resident London director in 1941. He returned to head office as assistant managing director in January, 1954. Mr. Carr is also chairman and director of a number of companies of the Ward group at home and abroad.

Also announced is the appointment of Mr. Douglas F. Walton, as a director of Thos. W. Ward, Limited. Mr. Walton, who has worked in the railway sidings department for many years, became a local director in 1948. Mr. Walton is also a director of the Ketton Portland Cement Company, Limited, Darlington Railway Plant & Foundry Company, Limited, and Railway & General Engineering Company, Limited.

Meehanite Sales Conference

A sales conference was held at the Café Royal, London, last month, under the ægis of the International Meehanite Metal Company, Limited. It was in the nature of a refresher course for sales engineers of licensee firms. Amongst the subjects discussed were the basic principles of the Meehanite process, the system of control, properties of the metal, its machinability and machining characteristics. The benefits accruing from product development and the use of a standard sales questionnaire were dealt with, and surface treatments and heat-treatments applicable to the castings were also brought to the notice of those attending. At question time, interesting discussions arose from the talks comparing Meehanite with competitive materials. The salesmen found the programme so informative that it has been decided to make these courses a regular feature in the future.

Personal

Mr. A. W. LOVATT, Trade Commissioner for the Federation of Rhodesia and Nyasaland, visited Birmingham earlier this week to meet local industrialists.

Mr. P. J. A. LACHELIN has been elected a director and appointed deputy chairman of the Pulsometer Engineering Company, Limited, Nine Elms Ironworks, Reading.

Mr. D. J. T. LAWMAN and Mr. R. ST. GEORGE have been appointed assistant managing directors of the Prestige Group, Limited, Burnley, Lancashire, and Mr. HUGH MURPHY has been elected an additional director.

Following a retirement, Mr. R. H. MARDELL has been appointed London sales manager of General Refractories, Limited; he will continue to operate from the firm's office at 25, Whitehall, London, S.W.1.

The new president of the National Union of Manufacturers, Mr. MORTON D. OLIPHANT, is a director of Tate & Lyle, Limited, Martins Bank, Limited, and other companies. He has succeeded Mr. CHARLES S. GARLAND in office.

Sir GEORGE DOWTY has received the thanks of the Minister of Labour and National Service on his retirement from the board of Remploy, Limited. Sir George is chairman of the Dowty Group, Limited, Cheltenham, and its subsidiaries.

Mr. R. MEYRICK has been appointed manager of the Cardiff office of the Staveley Iron and Chemical Company, Limited, Chesterfield, in succession to Mr. H. J. STARNS, who will retire on December 31 after 27 years with the company.

Mr. BERNARD DAWKINS has been appointed assistant manager for professional and technical recruitment and training of the Trafford Park, Manchester, education department of Metropolitan-Vickers Electrical Company, Limited.

Mr. A. T. COPE, formerly with Charles Churchill & Company, Limited, machine-tool manufacturers, West Bromwich, has been appointed additional sales engineer for the Rockwell Machine Tool Company, Limited, London, and will operate from the Midlands office.

Mr. N. C. MACDIARMID, managing director of Stanton Ironworks Company, Limited, near Derbyshire, was presented with a vice-president's badge of Stanton Ambulance Divisions by the division surgeon, Dr. R. N. Wilson, at a ceremony at Stanton's Exhibition on Building.

Sir JOHN WOODS and Mr. PAUL DE LASZLO, have been elected directors of the Marconi International Marine Communication Company, Limited. Sir John, who was a member of the Economic Planning Board from 1947, retired from the Civil Service in 1951. He is a director of Marconi's, Wireless Telegraph Company, Limited.

Mr. G. D. ELLIOTT, O.B.E., has been appointed deputy general works manager of Appleby-Frodingham Steel Company, a branch of the United Steel Companies, Limited, with effect from January 1. He will succeed Mr. J. D. Joy as general works manager on April 1 next. Mr. Joy becomes deputy general manager of the company on January 1.

Distributing awards for study at the annual presentation at Brown Bayley Steels, Limited, Sheffield, last week, Prof. A. G. QUARRELL, who is Pro-Vice-Chancellor of Sheffield University for 1958-59, emphasized the importance of technological education. Prof. Quarrell has been Professor of Metallurgy at the university and head of the Department of Metallurgy since 1955.

Mr. J. C. SIMONSON, who joined the National Steel Foundry (1914), Limited, as a metallurgist under the late Mr. George Batty in 1924, subsequently becoming director and general manager, is to retire on December 31, but will continue as a director and technical adviser to the company. Mr. A. A. MARSH has been appointed a personal assistant to the managing director as from December 1.

Mr. W. S. POXON, assistant chief metallurgist with Guy Motors, Limited, of Wolverhampton, has been outstandingly successful in the recent City and Guilds Institute of London examinations in advanced metallurgy, obtaining a first-class pass in each of the four sections of the examination. He was awarded the Institute's Silver Medal for being placed first in the country in section B, a similar medal and the Cutlers' Company prize for being first in the country in section D, and in addition he took a first-class award in the Higher National Certificate. Mr. Poxon, who is 22, studied at the County Technical College, Wednesbury, for the past five years.

Obituary

Mr. F. W. WHEELHOUSE, at one time manager of the old South Wigston Foundry, Wigston, near Leicester, died on December 2, at the age of 82.

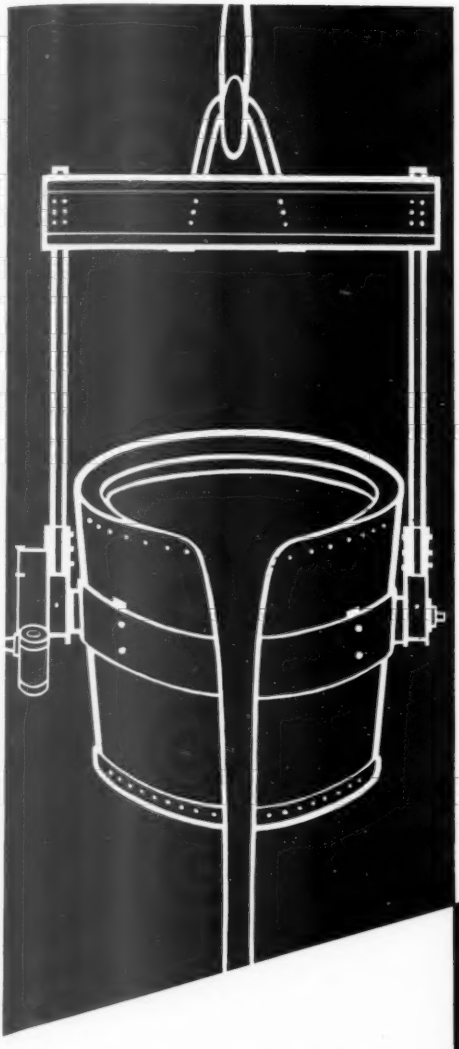
The death occurred on November 28 of Mr. RAYMOND C. MAHER, aged 48, export director and an assistant managing director of Ward and Goldstone, Limited, electrical manufacturers, Salford.

The death is reported of Mr. HARRY GRUNDY of the Renishaw Iron Company, Limited, near Sheffield. He was 73. When he retired in 1954 he had completed 21 years' service with the company, first as pig-iron salesman and later as sales manager.

The recent death of Mr. EDMUND DOUGLAS BOOL, chairman of Wm. Oxley & Company, Limited, steel manufacturers, of Rotherham (Yorks), is announced. He was 74. For 18 years Mr. Bool held the post of chief engineer with Thos. Firth & John Brown, Limited, the Sheffield and Scunthorpe steelmakers.

The death has occurred at the age of 76 of Mr. B. W. SMITH, formerly chairman director of Smith, Bingley & Evans, Limited, Birmingham. A son of one of the original founders, he had completed 60 years' service with the company. Since 1922 he had been on the board of directors and in 1945 he became chairman.

Mr. JOHN ALLAN MILLAR, a director of Dorman Long & Company, Limited, of Middlesbrough, died on December 1. He was 54. After qualifying in his native Glasgow as a chartered accountant in 1926, he joined Bolckow Vaughan & Company, Limited, Middlesbrough, which was later amalgamated with Dormans, and at this time Mr. Millar was appointed chief accountant of Dormans. Mr. Millar became a director of Redpath, Brown & Company, Limited, an associate company, in 1940 and in 1943 joined the board of the Tees-Side Bridge and Engineering Works Limited, Middlesbrough, another associate. He became a special director of Dormans in 1944 and a full director a year later.



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Company News

BICC bid for Telcon Shares

Offer to acquire the whole of the issued share capital of the Telegraph Construction & Maintenance Company, Limited (Telcon), on a share exchange basis has been made by British Insulated Callender's Cables, Limited. The basis of the offer was suggested by Thomson McLintock & Company, chartered accountants, at the request of both companies. Acceptance of the offer is recommended by the Telcon directors.

Conditions of Offer

BICC, in an announcement, said: "There has over the last few years been a small but growing co-operation between BICC and Telcon, particularly in certain countries overseas and on specific technical problems, which has been of mutual benefit. Having full regard to the conditions now applying and likely to apply in their respective fields of activities the directors of both companies are convinced that a unification of their interests is desirable."

Telcon, the statement continues, would continue as a separate entity within the BICC group. From an overall aspect there was undoubtedly a need for some form of integration and rationalization within the cablemaking industry to meet the problems of over-equipment and the substantial costs of keeping abreast of modern technical developments.

"The main potential benefits to both companies are the broadening of their base on the metals side, their respective interests in these fields being complementary to each other; the benefits which can accrue through a co-ordination of research and development effort and the rationalization of production and sales in fields in which both companies are interested, and the complete co-ordination of their interests in overseas investments. It will also give BICC an interest in long continuous lengths of submarine telephone cables in which field BICC can, through its wide telecommunications and submarine power cable interests, make a valuable contribution.

"Both companies are convinced that their most effective approach to present and likely conditions in the industry is the achievement of maximum efficiency in the broadest meaning of that word and the sale of their products and services at a reasonable return."

The BICC statement ends: "Both boards believe that the coming together of the two companies will assist in the achievement of these objectives and thus be beneficial to shareholders, customers, and personnel."

ATLAS STEEL FOUNDRY & ENGINEERING COMPANY, LIMITED—Amended figures have been issued by the company showing that profit for the year ended September 30, 1958, subject to audit, is £135,066 (£70,896) and not £175,066 as previously announced.

J. H. SANKEY & SON HOLDINGS, LIMITED, holding company for firebricks and fire cements, etc., manufacturers, of London, W.C.2—In maintaining the interim dividend at 10 per cent. the directors state that it is anticipated that the final for the year ending March 31, 1959, will be the same as for 1957-58—15 per cent.

CONSETT IRON COMPANY, LIMITED—During the year ended September 27, 1958, manufacturing and trading margin and other income fell sharply from £3,924,521 to £2,216,734. The balance is struck after debenture interest and a heavier depreciation charge. The dividend is again brought up to 8¾ per cent. with a final of 5¾ per cent. on the £10,000,000 ordinary capital.

CHAMBERLIN & HILL, LIMITED, ironfounders, of Walsall—Although the board warns that the net profit for the year will probably be considerably reduced, the firm is maintaining its interim dividend at 5 per cent. The board is confident it will be possible to maintain the final dividend at the same rate as in the last and several previous years. For the year to March 31, 1958, the final was 10 per cent., plus a bonus of 2½ per cent. (nil).

UNIVERSAL GRINDING WHEEL COMPANY, LIMITED—The company is paying a final dividend of 5 per cent., tax free, for the year ended September 27, 1958, on a capital doubled by a scrip issue, making the equivalent to 10 per cent. net as for the previous 12 months. This time there is also a special interim of 2½ per cent., tax free, declared for 1958-59. A profit of £366,841 compares with last years' total of £365,720, after tax of £409,327 (£426,593).

BAKER PERKINS, LIMITED, manufacturing engineers, and iron, steel, and brass founders, of Peterborough—Regarding the issue of £1,500,000 5¼ per cent. debenture stock, 1979-84, Morgan Grenfell & Company, Limited, has agreed to apply or procure applications for the stock at £98 per cent., payable £25 per cent. on application and £73 per cent. on January 28. Interest will be payable half-yearly on May 31 and November 30, the first payment in respect of the period to May, 1959, being £2 3s. 1d. (less income tax) per cent.

HURST, NELSON & COMPANY, LIMITED, manufacturers of rolling stock and component parts, etc., of Motherwell (Lanarkshire)—In consideration of the holders of the 200,000 £1 preference shares agreeing to their cancellation, Charles Roberts & Company, Limited, the controlling company, has undertaken to pay them 20s. per share. If the proposals are approved, the cancellation of the preference shares will give rise to a capital reserve of £200,000, and it is intended to capitalize this reserve by issuing 200,000 ordinary £1 shares to Charles Roberts. The issued capital of the company will, therefore, be restored to its present figure of £600,000, but it will consist entirely of ordinary shares held by Charles Roberts.

DOVER ENGINEERING WORKS, LIMITED—A bid for the ordinary capital of the company has been made by an undisclosed group of engineering companies. Announcing receipt of the bid, the board said that the chairman, his family, and co-directors own more than 50 per cent. of the capital and that they did not wish to accept this or any other offer. The solicitors for the group making the bid stated that the bid is of 6s. a share for the 1,400,000 2s. shares and the offer was subject to acceptance by holders of not less than 90 per cent. of the shares or such lesser amount as the bidders might accept within 14 days from December 1. The solicitors have written further to the chairman stating that their clients are willing to meet the board with a view to increasing their offer for the shares.

YARROW & COMPANY, LIMITED, shipbuilders, boilermakers, etc., of Glasgow—The chairman, Sir Harold Yarrow, states that although the company has a reasonable volume of work for the next two years, there has been a steady decline in new orders and inquiries for ships and land boilers are few and far between. Under the present highly competitive conditions the company is well placed regarding plant and buildings, but the effect of increasing costs of labour cannot be over-emphasized. Reorganization in the shipyard is nearing completion and major extensions to the fitting-out basin and an additional riverside wharf will be completed early next year. Group net profit for the year to June 30, 1958, is £199,518 (£218,811) and the dividend is maintained at 17½ per cent. A one-for-four scrip issue is proposed.

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Raw Material Markets

Iron and Steel

Production of castings shows no appreciable fluctuation, although there is a welcome sign of a continued increase in the demand for light castings. While this additional demand is not of sufficient proportion as to effect an overall improvement at the light foundries, some units connected with the domestic equipment trade report an increase in business. Following the relaxation of credit restrictions sales of cookers, refrigerators, fires, and other domestic equipment have increased, resulting in a reduction of stocks, and, in consequence, a larger call for castings. This improvement is welcomed in the trade, which has been very quiet for a long period, and it is expected that similar results will be obtained by the foundries supplying castings to the building trade.

High-phosphorus pig-iron is in plentiful supply for these foundries and the furnaces are anxious to dispose of their accumulated stocks and a larger proportion of their outputs. The jobbing foundries are steadily employed, but could undertake more business, and trade continues quiet at most of the textile foundries. The engineering foundries maintain reasonably good outputs of castings, and demands are at recent levels. The motor-car industry is scheduling for quantities which provide the foundries catering for them with fairly good order-books, and other units are receiving regular demands for high-duty castings from many trades, although in some instances these are now on a reduced scale.

These foundries continue to take up fairly substantial quantities of low-phosphorus iron, together with supplies of hematite and some refined iron. In all these grades available supplies are more than sufficient to meet demands.

Efforts are made to obtain business for all grades of pig-iron from overseas users. Some orders are being booked, but competition from producers abroad is severe and prices quoted by them are generally much lower than UK figures.

There is little change in trading conditions at the re-rollers and the call for small bars and light sections shows little, if any, improvement on recent demands from home users, while export business, apart from special quality steels, is negligible on account of the low prices offered by makers abroad. Most of the mills continue on a reduced number of shifts and production depends on a day-to-day programme as forward buying is scarce. A fairly good demand is maintained for reinforcing rods.

There is no difficulty in obtaining without delay from home steelworks present requirements of steel semis.

Non-ferrous Metals

There is now every indication that the price of copper, which has had a thorough shake-out, will shortly find its level. Up to the end of last week the price had fallen by some £40 a ton in a month, although it has still not yet returned to the level ruling in early September. Various events occurred at about that time, including the prolonged strike on the Rhodesian Copperbelt and the strike at International Nickel's plant in Canada, which had a pronounced effect on the red metal. The market in London still lacks consumer demand.

Consumer buying in tin is also quite small and price movements are within relatively narrow margins. The United States is reported to have bought a good quantity for tinplating purposes and covering of physical metal against this order is anticipated. Continental demand is quiet.

Lead has been steady. UK demand is on a hand-to-mouth basis, with no undue pressure to sell, however. In zinc, UK demand is reasonably good and a sizable backwardation reflects the continued tightness of nearby supplies.

Industrial Output Below 1957 Level

Industrial production is still running below the 1957 level, according to the official indices for October issued by the Treasury. In the basic industries output generally continued to fall or at best showed little improvement and the increases which occurred in some of the consumer goods industries were insufficient to bring the whole index up.

Seasonally adjusted, the index in October fell to 103/4, compared with 104 in September. Industrial production was less than 3½ per cent. below last year, but the October, 1957, figure was exceptionally low because of the epidemic of Asian flu. Compared with the September peak last year the fall is just under 5½ per cent.

The main reason appears to be the continuing recession in the capital goods industries. Steel output last month was 17 per cent. less than a year ago and the November figures are not likely to show much improvement. The machine-tool industry has also apparently not yet begun to show much sign of recovery.

The car industry, more buoyant than usual at this time of year, and the stimulus given to the makers of household goods by the relaxing of hire-purchase controls have produced an index of retail trade for October 4 per cent. higher than a year ago.

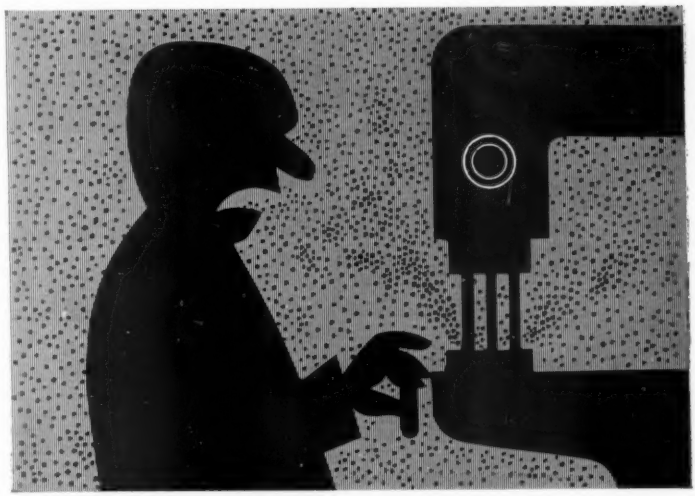
Iron-ore Imports

Iron-ore imports in October, and the totals for the first 10 months of this year and last, are shown below.

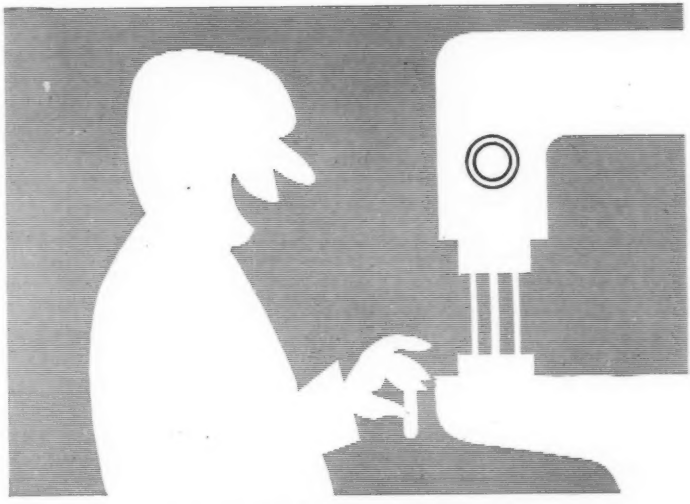
From	Month ended Oct. 31. 1958.	Ten months ended October 31. 1957.	1958.
	Tons.	Tons.	Tons.
Sierra Leone	54,960	644,296	610,488
Canada	329,774	2,644,131	1,961,300
Other Commonwealth countries and Eire	7	14,201	2,404
Sweden	211,463	3,485,524	2,677,654
Norway	13,789	215,169	230,719
Western Germany	—	126	5,115
France	47,813	535,086	419,597
Portugal	11,300	119,934	114,257
Spain	46,915	930,838	517,214
Algeria	80,542	1,245,842	1,191,049
French West Africa	13,520	524,821	306,685
Tunisia	31,340	610,808	474,049
Northern Morocco	8,680	200,261	120,040
Southern Morocco	13,400	328,468	301,716
Liberia	8,660	312,649	213,171
Venezuela	88,990	951,539	1,200,336
Brazil	65,092	574,521	485,755
Other foreign countries	4,126	83,464	186,517
TOTAL	1,030,371	13,421,678	11,018,066

WILLIAM JACKS & COMPANY, LIMITED—Mr. Lajpat Rai Patel, the company's chief manager in India, has been appointed a director as from January 1.

COMBUSTION CHEMICALS, LIMITED—Mr. H. N. Wigan, who recently resigned from the board of the Amber Chemical Company, Limited, has joined the board.



see us for dust



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Current Prices of Iron, Steel, and Non-ferrous Metals

(*Delivered unless otherwise stated*)

December 9, 1958

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2: Middlesbrough, £21 6s. 0d.; Birmingham, £20 18s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £23 17s. 0d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £24 1s. 3d.

Scotch Iron.—No. 3 foundry, £25 3s. 6d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 19s. 0d.; South Zone, £26 1s. 6d.

Refined Malleable.—P, 0.10 per cent. max.: North Zone, £27 6s. 6d.; South Zone, £27 9s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent.: N.-E. of England (local iron), £25 6s. 6d.; Scotland (Scotch iron), Zone S.1, £25 13s. 0d.; Sheffield, £26 15s. 0d.; Birmingham, £27 4s. 0d.; Wales (Welsh iron), £25 6s. 6d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leics.

FERRO-ALLOYS

(*Per ton unless otherwise stated, delivered*)

Ferro-silicon (6-ton lots and over).—45 per cent. Si, £44 0s. 0d. to £44 10s. 0d., scale 15s. 0d. per unit; 75 per cent. Si, £58 0s. 0d. to £62 10s. 0d., scale 16s. 0d. to 17s. 0d. per unit.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s. 6d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 8s. 6d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 11s. 6d. per lb. of W.

Ferro-chrome (6-ton lots and over).—4/6 per cent. C, £83 10s. 0d. to £87 0s. 0d., basis 60 per cent. Cr, scale 30s. 0d. to 30s. 6d., per unit; over 6 per cent. C, £79 10s. 0d. to £85 0s. 0d., basis 60 per cent. Cr, scale 30s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent. C,* 1s. 8½d. to 1s. 11½d. per lb. Cr; 0.15 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.10 per cent. C* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.06 per cent. C,* 1s. 10d. to 2s. 1d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £265 0s. 0d.; 96/98 per cent., £295 0s. 0d.

Ferro-columbium.—65/72 per cent., Nb + Ta, 19s. 9d. per lb., Nb + Ta.

Ferro-manganese (home).—78 per cent., £73 0s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., £32 15s. 6d.; tested, 0.08 to 0.33 per cent. C, £33 15s. 6d.; hard (0.41 to 0.60 per cent. C), £34 17s. 0d.; silico-manganese, £43 16s. 6d.; free-cutting, £36 14s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £41 1s. 0d.; silico-manganese, £44 4s. 0d.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.33 per cent. C, £38 10s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £39 12s. 6d.; acid, up to 0.25 per cent. C, £43 4s. 0d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £42 2s. 0d.; boiler plates (N.-E. Coast), £44 12s. 0d.; floor plates (N.-E. Coast), £43 11s. 0d.; angles (N.-E. Coast), £39 16s. 6d.; joists (N.-E. Coast), £39 12s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £40 0s. 6d.; under 10 tons to 4 tons, £40 18s. 0d.; under 4 tons to 2 tons, £41 3s. 0d.; hoop and strip, coils, £39 0s. 0d.; uncoated strip mill coils, hot rolled, under 3mm. to 12g., £44 16s. 0d.; black sheets (hand mill), 24g., £58 14s. 6d.; galvanized corrugated sheets, 24g., £67 10s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £68 10s. 0d.; nickel-chrome, £99 11s. 0d.; nickel-chrome-molybdenum, £111 19s. 0d.

NON-FERROUS METALS

Copper.—Cash, £215 15s. 0d. to £216 10s. 0d.; three months, £215 15s. 0d. to £216 0s. 0d.; settlement, £216 0s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 2s. 1½d. per lb.; rods, 239s. 6d. per cwt. basis; 20 s.w.g., 274s. 6d. per cwt.

Tin.—Cash, £758 10s. 0d. to £759 0s. 0d.; three months, £759 0s. 0d. to £759 10s. 0d.; settlement, £759 0s. 0d.

Lead (Refined Pig).—First half December, £70 15s. 0d. to £71 0s. 0d.; first half March, £71 0s. 0d. to £71 2s. 6d.

Zinc.—First half December, £72 15s. 0d. to £73 5s. 0d.; first half March, £69 10s. 0d. to £70 0s. 0d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £109 0s. 0d.; rolled zinc (boiler plates), all English destinations, £106 15s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £95 10s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 8⅞d. per lb.; sheets to 10 w.g., 186s. 6d. per cwt.; wire, 2s. 6⅝d.; rolled metal, 186s. 6d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £144; B6 (85/15), —; BS249, —.

Brass (High Tensile).—BS1400, HTB1 (30 tons), £178; HTB2 (38 tons), —; HTB3 (48 tons), —.

Gunmetal.—BS1400, LG2 (85/5/5/5), £178; LG3 (86/7/5/2), £189; G1 (88/10/2/½), £247; (88/10/2/1), £237.

Phosphor Bronze.—BS1400, PB1 (AID released), £275 per ton.

Leaded Phosphor Bronze.—BS1400, LPB1 (1060), £202 per ton.

Phosphor Bronze Strip, etc.—Strip, 272s. 9d. per cwt.; wire, 3s. 11½d. per lb.; rods, 3s. 2½d.; tubes, 3s. 2½d.; chill cast bars: solids 3s. 2d.; cored 3s 3d. (CHARLES CLIFFORD, LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 9d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 2d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 1d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 5½d. per lb. Antimony, English, 99 per cent., £190 0s. 0d. Quicksilver, ex-warehouse, £74 0s. 0d. Nickel, £600 0s. 0d. Aluminium ingots, £180 0s. 0d.; aluminium bronze (BS1400), AB1, £226; AB2, £230.

* Average 68-70 per cent.